CRITERION 4: CONTINUOUS IMPROVEMENT

4.A Program Educational Objectives
4.B Student Outcomes
   4.B.1 The Overall/Comprehensive Program Assessment Process
   4.B.2 The Overall/Comprehensive Student Outcome Assessment Activities
   4.B.3 The Student Outcome Assessment Process
4.C Continuous Improvement
4.D Additional Information
4.E The College of Engineering Strategic Planning Process
4.A Program Educational Objectives

As described in Section 2.E, the Program Educational Objectives are assessed and evaluated every six years (a full AE/E cycle) by directly drawing constituency input as well as by assessing the Student Outcomes. Feedback regarding the PEOs is collected from constituencies in nonformal (indirect) and formal (direct) ways. Input from current students is obtained indirectly through faculty advisors and student representatives based on advisor and student conversations during their regular activities. The information is shared with the department faculty during the process of reviewing the PEOs. The process of assessing, evaluating, and revising the Program Educational Objectives is performed as shown in Figure 2.E.1 – The Assessment of Program Educational Objective. The process is performed per program assessment schedule shown in Figure 2.E.2. For clarity, Figures 2.E.1 and 2.E.2 are reproduced as shown in Figure 4.A.1 and Figure 4.A.2 below:

**Figure 4.A.1:** The Assessment of Program Educational Objectives

**Figure 4.A.2:** The Overall Program Assessment Schedule

Table 4.A.1 below indicates the types of assessment used, their respective results and methodology and the data that is obtained.

**Table 4.A.1:** PEO Assessment Methodology and Data

<table>
<thead>
<tr>
<th>Cycle Length</th>
<th>Indirect Assessment Method</th>
<th>Assessment Results</th>
<th>Evaluation Method</th>
<th>Achievement</th>
</tr>
</thead>
</table>
| 6 years      | 1. Department Advisory Council meetings  
2. Employer Surveys  
3. Alumni Surveys | 1. Meeting minutes  
2. Survey results  
3. Survey results | 1. Discussion  
2. Analysis  
3. Analysis | 1. Agreement among faculty and DAC  
2. Levels of support and ranking  
3. Levels of support and satisfaction |
As described previously, the PEO loop includes PEO assessment data collection, data evaluation, and the revision of PEO if necessary. A completed flowchart and sub-flowcharts of the AE/E process are shown in the next section of this self-study report, where the constituencies’ input for PEOs is collected during the one-year assessment phase through meetings with industry advisors and surveys of alumni and employers.

Input from meetings and surveys are compiled and documented by the EE Assessment and Enhancement Committee in the first semester of the one-year evaluation phase. The Committee makes an initial recommendation on the possibility of revising the PEOs and the schedule of implementation. The entire faculty discusses and decides on the Committee’s recommendations in a half-day meeting. Following the discussion, the department organizes a meeting between faculty and Department Advisory Council (DAC) for additional discussion and recommendation. After the DAC meeting, faculty vote on the recommendations that will be implemented during the last two semesters of the one-year implementation phase.

Note that the implementation of the revised PEO may lead to the modifications of the Student Outcomes’ levels of importance, which in turn may lead to the revision of curriculum and department operations. Since each phase in the AE/E cycle has 2 semesters, the affects of modifying PEO to other levels of the curriculum can be evaluated and justified in the same Outcome cycle if the evaluation of PEO can be completed in 1 semester.

For employer surveys, the employers were asked to rank the importance of each PEO and to rate the SJSU EE graduates who worked for them. In ranking the importance of the PEO, the employer can choose answers from “Very Important” for 5 points to “Not Important” for 0 points. The survey results are then normalized to 100% maximum, which is equivalent to all answers being “Very Important.” For rating the EE graduates in meeting a PEO, the employer can choose answers from “Strongly Agree” for 5 points to “Disagree” for 0 points. The survey results are then normalized to 100% maximum, which is equivalent to all answers stated as “Strongly Agree.” Besides the survey questions, written comments and recommendations for other PEOs are also solicited. To make the survey questions understandable, the questions are posed so that several questions corresponded to a particular PEO. Note that the responses from employer surveys can be considered as direct assessment of PEOs.

For alumni surveys, the alumni were asked to rank the importance of each PEO and to rate their satisfaction in meeting these PEOs. For ranking the importance of the PEO, the alumni can choose answers from “Very Important” for 5 points to “Not Important” for 0 points. The survey results are then normalized to 100% maximum, which is equivalent to all answers being “Very Important.” For self-rating in meeting a PEO, the alumni can choose answers from “Very Satisfied” for 5 points to “Very Dissatisfied” for 0 points. The survey results are then normalized to 100% maximum, which is equivalent to all answers being “Very Satisfied.” Similar to employer surveys, written comments and recommendations for other PEOs are also solicited in the alumni survey. While employer survey responses can be considered as direct assessment data, the responses from alumni can only be considered as indirect assessment data.

Our goal for each PEO is to have high levels of importance from employers and alumni. High levels of importance show that our Program Educational Objectives are meeting the
constituencies’ expectations. In surveying the ranking of EE graduates by the employers, our goal is to have reasonable differences between the employers’ level of importance for each PEO and the achievement levels of the SJSU EE graduates. Comparably, in surveying alumni about the levels of satisfaction of each PEO, our goal is to have reasonable differences between the levels of importance for each PEO and the levels of satisfaction the alumni think they have achieved. Table 4.A.2 below shows the expected level of attainment for each of the Program Educational Objective:

Table 4.A.2: Expected Level of Attainment

<table>
<thead>
<tr>
<th>PEO</th>
<th>Employers</th>
<th>Alumni</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level of Importance</td>
<td>Difference between Importance &amp; Achievement</td>
</tr>
<tr>
<td>1</td>
<td>&gt; 80%</td>
<td>&lt; 25%</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 75%</td>
<td>&lt; 25%</td>
</tr>
<tr>
<td>3</td>
<td>&gt; 75%</td>
<td>&lt; 25%</td>
</tr>
<tr>
<td>4</td>
<td>&gt; 75%</td>
<td>&lt; 25%</td>
</tr>
</tbody>
</table>

Based on the schedule, we assessed the previous PEOs in 2007 by two major surveys to employers and alumni. Employers were asked to rate each recent graduate employee on their level of achievement on each Program Educational Objective. The results of this survey are tabulated as shown in Section 2.E and are reproduced as shown in the tables below. Similarly, alumni are asked to rate their satisfaction with how their education contributed to their career. The results of this survey are also tabulated and analyzed together with the employer surveys as shown in Section 2.E.

Table 4.A.3: Employer and Alumni Survey Results of (OLD) PEOs

<table>
<thead>
<tr>
<th>PEO</th>
<th>Employers</th>
<th>Alumni</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level of Support</td>
<td>% Diff</td>
</tr>
<tr>
<td>1</td>
<td>88.6%</td>
<td>16.9%</td>
</tr>
<tr>
<td>2</td>
<td>72.6%</td>
<td>3.6%</td>
</tr>
<tr>
<td>3</td>
<td>82.9%</td>
<td>27.6%</td>
</tr>
<tr>
<td>4</td>
<td>72.9%</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

Based on the assessment results and a concern stated in the previous ABET review, the EE faculty has proposed two revised sets of Program Educational Objectives during the fall 2009 ABET retreat. The faculty and the Department Advisory Council (DAC) met in the spring 2010 semester and a final set of PEOs was adopted (meeting minutes are included in Appendix E).

Alumni surveys were performed in fall 2010 semester as shown in Section 2.E above and results are again reproduced in Table 4.A.4 below. The results show that the alumni value the importance of PEO all above the expected levels. For the differences between levels of importance and self-satisfaction, the expectation for PEO #2, #3, and #4 are met but not for PEO #1. As discussed earlier, since most of the alumni who responded to the surveys are the ones who just recently graduated and are still in graduate schools, it is explainable for the alumni to feel that their satisfaction level in PEO #1 has not yet been achieved. The alumni survey results for
PEO #1 however were brought to faculty’s attentions and together with the assessment results of related Student Outcome, the department is in the process of re-defining the technical areas with their mission and responsible topics for each technical area committee. Most of the department meetings during spring 2011 semester have been dedicated for these activities. Meeting minutes are included in Appendix E.

<table>
<thead>
<tr>
<th>PEO</th>
<th>Level of Supports</th>
<th>Difference between Importance &amp; Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expectation</td>
<td>Survey Results</td>
</tr>
<tr>
<td>1</td>
<td>&gt; 80%</td>
<td>82.1%</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 75%</td>
<td>81.7%</td>
</tr>
<tr>
<td>3</td>
<td>&gt; 75%</td>
<td>90%</td>
</tr>
<tr>
<td>4</td>
<td>&gt; 75%</td>
<td>83.3%</td>
</tr>
</tbody>
</table>

Table 4.A.4: Alumni Survey Results of Current PEO

As shown in Table 3.B.1 - Program Educational Objectives (PEOs) vs. Student Outcomes (SOs) in the Section 3.B, the PEO #1 and #2 cover almost all Student Outcomes of our program. Assessing and improving the SOs will automatically improve these PEOs as described in the next section. Note that in order to classify particular Student Outcomes that will be able to deliver desired PEO, faculty discussions have been organized to weight the levels of support from SOs to particular PEO as shown in Section 3.B. These levels of support have been used as one of many other factors for the Outcome Champions to assess and evaluate the performance of SO as shown in the champion reports (included in Appendix H). Quite several recommendations were implemented in spring 2011 semester as shown in Section 4.B.

In order to understand the career paths of EE graduates, as well as the level of satisfaction from the employers for our EE graduates, we collected information about the employment rate of SJSU Electrical Engineering students who reported having a job prior to Graduation. The information shows that 29% of May 2009 graduates had been hired. Since the information is self-report, the data only suggests the percentage of students that are finding placement upon graduation. Since the overall percentage of students employed at the time of graduation in the College of Engineering is 33%, the information shows that the EE department should look into the job trends for EE graduates and perform some studies for improvement if necessary. It is worth mentioning that the average from non-engineering departments at SJSU is about 27% and the national average is 24.4% (according to the National Association of Colleges and Employers.)

### 4.B Student Outcomes

Sections 4.B.1 and 4.B.2 below describe the overall/comprehensive Student Outcome Assessment, Evaluation, and Enhancement (AE/E) process implemented for the Electrical Engineering program at SJSU. For each assessment cycle, faculty decides which portion of the process and data that needs to be emphasized for that particular cycle based on the previous assessment results, technology trends, job markets, etc... Student Outcome AE/E process for 2010-2012 cycle is described in Section 4.B.3
4.B.1 The Overall/Comprehensive Program Assessment Process

The department’s assessment and enhancement effort is led by the Department Assessment and Enhancement Committee (AEC). This committee (chaired by ABET coordinator) coordinates all assessment and evaluation (A/E) activities undertaken by Outcome Champions and Course Coordinators. Figure 4.B.1 depicts the EE Department’s assessment process. As shown in the figure, this process consists of three parts: The course, the Student Outcome (SO), and the Program Educational Objective (PEO) assessments. Once the PEOs are in place, they drive the program assessment and enhancement cycle. The program enhancements resulting from assessments may impact the EE program in the areas of curricular structure, program operations, and/or curricular content specific to particular courses.

As described previously in this report, the PEO assessment process has a six-year cycle consisting of a one-year assessment and a one-year evaluation phase. The first semester of the evaluation phase is important. If the decisions on PEO enhancement/revision can be made during this semester, then recommendations for improvement of Student Outcomes can be considered with revised PEO during this outcome cycle.
The Student Outcome assessment process has three-year cycle with its own set of assessments conducted during the one-year assessment period. During the first SO cycle, the SO evaluation phase overlaps the PEO phase as assessment data from both processes are evaluated during the same semester. The end result specifies action items to meet the new PEOs (or to improve the current PEOs) and establishes action items to improve the program’s effectiveness based on defined SOs.

At the course level, there is a shorter one-year course assessment and enhancement cycle during which course assessments are conducted every semester; assessment results are evaluated, and action items defined in the second semester. For each course, enhancements are recorded in the Course Maintenance record and this data will be reviewed during the SO evaluation cycle.

In summary, a six-year PEO loop and three-year SO loop coupled with annual course A/E loops will ensure the improvement of the EE program in a timely fashion.
4.B.2 The Overall/Comprehensive Student Outcome Assessment Activities

To ensure the achievement of each Student Outcome, one or more EE faculty members were assigned as the champions of one particular Student Outcome as shown in the Table 4.B.1 below. The champion and the course coordinator together define the levels of support that a course may contribute to the achievement of the Student Outcomes as shown in Table 4.B.3 - Courses to Student Outcomes. The responsibilities of a champion can be summarized as below:

· Review PEO vs. SO to determine the level of contribution that the SO would contribute to particular PEO(s)
· Together with the course coordinators, review the Course Learning Objectives (CLO), course syllabi, and course materials to determine the SO levels of support for each course.
· Prepare and collect documents to provide evidence that the SO is achieved.
· Recommend methods to assess the SO and determine a quantifiable measure of the assessment results.
· Suggest a goal for each SO based on the quantifiable measure.
· Make recommendations on how to improve the effectiveness of the program in meeting a particular SO.
· Propose changes to the program objectives based on direct assessment data, survey results and feedbacks from constituencies.

Table 4.B.1: Outcome Champion vs. Student Outcome

<table>
<thead>
<tr>
<th>Student Outcome</th>
<th>Champion</th>
</tr>
</thead>
<tbody>
<tr>
<td>a an ability to apply knowledge of mathematics, science, and engineering</td>
<td>Sotoudeh Hamedi-Hagh</td>
</tr>
<tr>
<td>b an ability to design and conduct experiments, as well as to analyze and interpret data</td>
<td>Peter Reischl</td>
</tr>
<tr>
<td>c an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
<td>Thuy T. Le</td>
</tr>
<tr>
<td>d an ability to function on multidisciplinary teams</td>
<td>David W. Parent</td>
</tr>
<tr>
<td>e an ability to identify, formulate, and solve engineering problems</td>
<td>Lili He</td>
</tr>
<tr>
<td>f an understanding of professional and ethical responsibility</td>
<td>David W. Parent</td>
</tr>
<tr>
<td>g an ability to communicate effectively</td>
<td>David W. Parent</td>
</tr>
<tr>
<td>h the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</td>
<td>Tri Caohuu</td>
</tr>
<tr>
<td>i a recognition of the need for, and an ability to engage in life-long learning</td>
<td>David W. Parent</td>
</tr>
<tr>
<td>j a knowledge of contemporary issues</td>
<td>David W. Parent</td>
</tr>
<tr>
<td>k an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
<td>Jalel Rejeb</td>
</tr>
<tr>
<td>l a competence in one or more technical specialties that meet the needs of Silicon Valley companies.</td>
<td>Robert H. Morelos-Zaragoza</td>
</tr>
</tbody>
</table>

1 Spring 2010 Course Assessment Journal by Dr. Jeanne Linsdell, Director of Technical Communication, College of Engineering
In addition to the 12 Student Outcomes listed above, we continuously assess 3 additional criteria (m), (n), and (o) as listed below:

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Evaluator</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>a knowledge of probability and statistics, including applications appropriate to Electrical Engineering program.</td>
</tr>
<tr>
<td>n</td>
<td>a knowledge of advanced mathematics through differential and integral calculus, differential equations, linear algebra, complex variables, and discrete mathematics.</td>
</tr>
<tr>
<td>o</td>
<td>a knowledge of basic sciences, computer science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components, as appropriate to Electrical Engineering program</td>
</tr>
</tbody>
</table>

In the Courses vs. Student Outcomes table (Table 4.B.3) below, the numbers 0 to 5 are equivalent to the levels of attainment of a course to a particular Student Outcome, where 0 (or empty) is the lowest and 5 is the highest. The levels of attainment shown for “Technical Electives” are the overall of most popular elective courses taken by EE students. Moreover, courses used for the assessment of the Student Outcomes are the required (mandatory) courses and the assessment of technical elective courses is only for Student Outcome 1 (a competence in one or more technical specialties that meet the needs of Silicon Valley companies). Shaded cells in the table show particular courses used to assess particular SO during the 2010-2012 assessment cycle. Since the EE Department does not directly involve in the assessment of General Education (GE) courses, student outcomes that are covered in the required GE courses were assessed by using the capstone design project, which are the end results of overall contribution from the whole program.

Criterion 5 and Criterion 8 (Program Criteria) of the report describe in details the required 51-unit General Education program and its assessment process. In general, the GE program goes through a detailed planning and review process at the university level by the General Education Advisory Panels (GEAPs) and Board of General Studies (BOGS). The GEAPs and the BOGS incorporate more than 80 faculty members in the review and assessment process of GE courses. The list of the members can be found at www.sjsu.edu/ugs/ge/bogs/geap-bogs_members/. The university policy regarding annual GE assessment can be found in the University Policy S09-2 (http://www.sjsu.edu/senate/S09-2.htm) and in the recent “GE Annual Report Memo” included in Appendix H of this report.

The course assessment and enhancement activities take place in an on-going fashion. The assessment tasks tied to particular courses need to be undertaken every semester to ensure all students are assessed. These include the EE101 Exam, the senior skill audit exam, capstone project evaluations, and team evaluations. The evaluation and enhancement activities include technical area committee discussion, reviewing course assessment and evaluation methods, and modifying course content. The results of course assessment and enhancement activities are documented in the Course Maintenance records (included in Appendix I.)
Table 4.B.3: Levels of Attainment of Courses to Student Outcomes

<table>
<thead>
<tr>
<th>Category</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
<th>l</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE Area A: Basic Skills</td>
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<td>4</td>
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<td>GE Area B: Science &amp; Mathematics</td>
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<td>GE Area C: Humanities &amp; the Arts</td>
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<td>4</td>
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<tr>
<td>GE Area D: Social Science</td>
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<td>3</td>
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<tr>
<td>GE Area E: Human Understanding &amp; Development</td>
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<tr>
<td>SJSU Studies R: Earth &amp; Environment</td>
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<tr>
<td>SJSU Studies S: Self, Society &amp; Equality in the U.S.</td>
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<td>4</td>
<td>2</td>
<td>2</td>
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<tr>
<td>SJSU Studies V: Culture, Civilization &amp; Global Understanding</td>
<td>2</td>
<td></td>
<td>2</td>
<td>4</td>
<td>3</td>
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<tr>
<td>SJSU Studies Z: Written Communication II</td>
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<td>EE 120</td>
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<td>4</td>
<td>5</td>
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<td></td>
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<td>4</td>
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<td>EE 122</td>
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<td>4</td>
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<td>EE 124</td>
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<td>EE 132</td>
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<td>EE 142</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
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<td>3</td>
</tr>
<tr>
<td>EE 160</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EE 198A</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 198B</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
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<tr>
<td>Technical Electives</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. GE Area B covered within required courses in Mathematics, Physics and Chemistry
2. SJSU Studies R and Z covered within required course ENGR 100W
3. Spring 2009 and 2010 Course Assessment Journals by Dr. Jeanne Linsdell, Director of Technical Communication, College of Engineering
4. Students are required to take 4 Technical Elective courses

One or more EE faculty members were assigned as champions of one particular Student Outcome as described previously. During the assessment phase, the champions and the ABET team together work on the survey questionnaires and assessment methods. During the evaluation phase, the champions study the assessment results, which include the cycle survey results, continuous direct course assessment results from course instructors and coordinators, course
sylabii, course maintenance records, and other data of EE curriculum with a focus on his/her championed outcome. Each champion reports his/her findings and recommendations to the faculty during the first and second semesters of the two-year evaluation/enhancement phase of a three-year Student Outcome AE/E cycle. It is the champion’s responsibility to ensure that our EE program meets his/her championed Student Outcome. To facilitate the champion’s tasks, a table of Courses vs. Student Outcomes was developed to link the courses to the Student Outcomes as shown above. This table was developed with the participation of all faculty members, including full-time and part-time. The process of evaluating Student Outcome and champion recommendations for program improvement can be found in the champion reports included in the Appendix H of this document.

The department uses a variety of strategies, tools, and methods to assess various aspects of its program in order to continuously improve effectiveness in meeting the student outcomes. The assessment strategies include the establishment of Course Learning Objectives (CLOs), direct course performance assessment, indirect course evaluations from students, the assessment of course contribution to Student Outcomes, placement examination, junior/senior/alumni/employer surveys, area committee reports, senior skill audit examinations, capstone design project evaluations and team evaluations. Tables 4.B.4 and 4.B.5 below provide summaries of various assessment strategies, tools, and methods employed for the assessment of the EE program, including the direct assessment of Student Outcomes (SO), Course Learning Objectives (CLO), direct assessment through entering and exiting examinations, course performance data, capstone design projects, communication skills, as well as indirect assessment via teamwork reports, end-of-course evaluation and constituency surveys. Not included in the tables is routine evaluation of instruction through the use of SOTE (Statement Of Teaching Effectiveness) forms, which are administered every semester jointly by the university and the department. If a Student Outcome is selected for enhancements, then its contributing courses can be identified and enhanced. The EE101 Examination is to assess and prepare junior students for upper-division EE circuit courses. The senior skill audit exam, capstone project evaluation, and team evaluation surveys assess graduating seniors’ capabilities in analysis, design, technical work, and team work.

Below are summaries of the assessment strategies, methods and tools:

**Course Contents Establishment:** For each course, the course instructor, course coordinator, and area committee must discuss and agree on the Course Learning Objectives (CLOs) of the course, including the course content, level of depth, and pre-requisites. Based on the CLOs, the levels of support that a particular course contributes to the Student Outcomes (SOs) are defined. The enhancement and/or revision of the CLOs are based on the student performance (homework, quizzes, exams, and projects) and Student Outcome assessment data. Since the course content evaluations are prepared by the faculty and their contents are subjective, they should be used as a reference rather than an assessment document. All changes to the course are documented in the Course Maintenance Record included in the Appendix I of this report.
Table 4.B.4: Program Assessment Methods and Strategies

<table>
<thead>
<tr>
<th>Assessment / Establishment</th>
<th>By</th>
<th>Indicators</th>
<th>Used to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Contents</td>
<td>Instructor, coordinator, area committee</td>
<td>Course Learning Objectives (CLOs)</td>
<td>Define levels of support to a Student Outcome (SO)</td>
</tr>
<tr>
<td>Course Performance</td>
<td>Instructor and coordinator</td>
<td>Exams, homework assignments, projects, etc...</td>
<td>(Direct) Assess CLOs and SOs</td>
</tr>
<tr>
<td>Course Evaluation</td>
<td>Student responses to Course Survey</td>
<td>End-of-course survey results</td>
<td>(Indirect) Assess CLOs and SOs</td>
</tr>
<tr>
<td>Courses vs. SOs</td>
<td>Instructor, coordinator, criterion champion</td>
<td>Course Learning Objectives (CLOs)</td>
<td>Map courses to SOs</td>
</tr>
<tr>
<td>EE101 Exam</td>
<td>EE101 instructor and faculty</td>
<td>Exam scores</td>
<td>(Direct) Assess CLOs and SOs</td>
</tr>
<tr>
<td>Junior Survey</td>
<td>Student responses to Junior Survey</td>
<td>Results from Junior Survey Form</td>
<td>(Indirect) Assess SOs</td>
</tr>
<tr>
<td>Senior Skill Audit Exam</td>
<td>Exam coordinator and faculty</td>
<td>Exam scores</td>
<td>(Direct) Assess SOs and CLOs</td>
</tr>
<tr>
<td>Capstone Project</td>
<td>Project advisors and coordinator</td>
<td>Proposals, reports, presentations, demonstrations</td>
<td>(Direct) Assess CLOs and SOs</td>
</tr>
<tr>
<td>Team Evaluation</td>
<td>Student reports</td>
<td>Self-evaluation</td>
<td>(Indirect) Assess SOs</td>
</tr>
<tr>
<td>Senior Survey</td>
<td>Student responses to Senior Survey</td>
<td>Results from Senior Survey Form</td>
<td>(Indirect) Assess SOs</td>
</tr>
</tbody>
</table>

Table 4.B.5: Assessment Tools vs. SO and CLO

<table>
<thead>
<tr>
<th>Items Assessed</th>
<th>Main Assessment Tools</th>
<th>Performed by</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Learning Objectives (CLOs)</td>
<td>1. Course instructor, coordinator, and area committee discussion 2. End-of-course student evaluation 3. Course assignments (exams, homeworks, project, labs, etc...)</td>
<td>1. Course instructor, coordinator, area comm. 2. Course instructor 3. Course instructor</td>
<td>1. Continuous 2. Continuous 3. Continuous</td>
</tr>
<tr>
<td>Entering and exiting competencies</td>
<td>1. EE101 examination 2. Senior skill audit examination</td>
<td>1. EE101 instructor &amp; faculty 2. Senior project coordinator and faculty</td>
<td>1. Continuous 2. Continuous</td>
</tr>
<tr>
<td>Overall program structure, technical areas, etc.</td>
<td>1. Faculty and area committee discussion 2. Department meeting 3. Faculty and DAC meeting 4. College advisory board meeting, chair council meeting, etc...</td>
<td>1. Faculty 2. Department chair 3. Faculty 4. Department chair</td>
<td>1. Continuous 2. Continuous 3. Assessment cycle 4. Continuous</td>
</tr>
</tbody>
</table>

Course Performance Assessment: The course instructor performs direct assessment of his/her course every semester and the assessment data is reported to the course coordinator. This direct assessment includes examinations, class project, quizzes, and homework assignments. The
instructor and course coordinator is responsible for relating the assessment data to the CLO and determining if any CLO met the target. If necessary, the instructor and course coordinator work on revisions of the course structure, contents, assessment methods, and propose the modifications to area committees before reporting them to department faculty during regular department meetings. All course enhancements are documented in the Course Maintenance Record for each semester. During the assessment cycle, the history of course performance assessment data and enhancement is used by the ABET criterion champion for the assessment of Student Outcomes.

**Course Evaluation:** At the end of the semester, students fill out a course evaluation form to evaluate the course’s contribution to meeting the CLOs. Before 2003, the Course Evaluation form was created by the department and was separated from the university SOTE. After 2003, course evaluation questions are included in the university SOTE form and so the department Course Evaluation form was eliminated. The results from this evaluation are used by the course instructor for course enhancement. The instructor can also summarize the results to the course coordinator and the criterion champion so that they can be used as indirect assessment data for the Student Outcomes.

**Establishment of the Relationships between Courses and Student Outcomes:** For each course, the course coordinator, the criterion champion, and the assessment team must discuss and agree on the level of support that the course contributes to the Student Outcomes. The discussions also include the use of course assessment data and course materials for the assessment of SO. Since the evaluations of course contribution to Student Outcomes are prepared by the faculty and their contents are subjective, they should be used as a reference rather than an assessment document.

**EE101 Exam:** EE110 is a first-semester junior level course in circuit analysis. All students, whether they are from SJSU or community colleges, must pass EE101 exam prior to registering for EE110. The exam covers the topics taught in EE098, the first circuit analysis course, and with some additional problems in Calculus and Differential Equations. The additions of Calculus and Differential Equation questions in current EE101 exams are the results of previous assessment and enhancement processes. The exam consists of 25 multiple-choice problems selected from a set of 200 problems developed by the EE faculty. The problem bank is available on the department’s web page for students to practice. Results from this exam indicate whether students are properly prepared to start their upper-division study. The results from EE101 exams are also used by the criterion champion as part of the assessment data for the Student Outcomes. Table 4.B.6 shows the available EE101 assessment data from 2007. Students who failed EE101 exam will have to retake the exam at the later dates and so will delay their progress in the program.

**Area Committee Report:** The department has area committee meetings among the faculty who are in same teaching and research areas. The area committee meetings are called by the committee chair and most of the committees meet 1 to 3 times each semester. The minutes of these area committee meetings are documented and presented to the faculty during the regular department meetings. The department does not keep the area committee meeting minutes since final discussions and decisions are made at the regular department meetings and/or ABET retreat meetings, and the meeting minutes are included in Appendix E. Meeting with the students is a
responsibility of the area committee so that students can present their views and suggestions about the department’s program and operations.

<table>
<thead>
<tr>
<th>Date of exam</th>
<th># of exams</th>
<th># passed</th>
<th>% passed</th>
<th>Date of exam</th>
<th># of exams</th>
<th># passed</th>
<th>% passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/20/2007</td>
<td>47</td>
<td>19</td>
<td>40%</td>
<td>05/01/2009</td>
<td>39</td>
<td>29</td>
<td>74%</td>
</tr>
<tr>
<td>05/26/2007</td>
<td>85</td>
<td>34</td>
<td>40%</td>
<td>08/29/2009</td>
<td>45</td>
<td>18</td>
<td>40%</td>
</tr>
<tr>
<td>09/01/2007</td>
<td>98</td>
<td>46</td>
<td>47%</td>
<td>12/12/2009</td>
<td>73</td>
<td>30</td>
<td>41%</td>
</tr>
<tr>
<td>12/15/2007</td>
<td>100</td>
<td>41</td>
<td>41%</td>
<td>02/05/2010</td>
<td>58</td>
<td>22</td>
<td>38%</td>
</tr>
<tr>
<td>01/26/2008</td>
<td>69</td>
<td>31</td>
<td>45%</td>
<td>05/22/2010</td>
<td>74</td>
<td>39</td>
<td>52%</td>
</tr>
<tr>
<td>05/17/2008</td>
<td>86</td>
<td>44</td>
<td>51%</td>
<td>09/03/2010</td>
<td>73</td>
<td>47</td>
<td>64%</td>
</tr>
<tr>
<td>09/13/2008</td>
<td>82</td>
<td>31</td>
<td>38%</td>
<td>12/11/2010</td>
<td>75</td>
<td>33</td>
<td>44%</td>
</tr>
<tr>
<td>12/13/2008</td>
<td>89</td>
<td>35</td>
<td>39%</td>
<td>02/03/2011</td>
<td>50</td>
<td>20</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>05/21/2011</td>
<td>82</td>
<td>40</td>
<td>49%</td>
</tr>
</tbody>
</table>

Senior Skill Audit Examination: All EE students must take a Senior Skill Audit Examination during the second (last) semester of their Senior Design Project (EE198B) course. Problems in this exam are based on topics in core EE courses and from Silicon Valley interview questions. Collecting and reviewing these interview questions provides us with another form of feedback from industry. Since some of these problems in the skill audit exam are from external sources, students’ performance in this exam is an indication on how they measure up to the engineering community’s expectations. The original skill audit exam consisted of 50 items in free response format and students took the exam during a 3-hour period. Most of the questions were created with the intention of measuring student mastery levels without preparation. The exam covers questions in five main areas: digital, solid state, electromagnetic, circuits, and systems.

Before fall 2007 semester, the Senior Skill Audit Examination contributes up to 10% of the grade of EE198B (second course of the two-semester Senior Design Project course). Per assessment results from previous AE/E cycles, faculty voted for a revision: that all students must pass the Senior Skill Audit Exam with 80% or above in order to receive EE198B grade. The exam is scheduled for two times per semester and students must take an online multiple-choice practice exams during the EE198A semester to prepare for the official 10-question in-class exam in EE198B. Students are allowed to retake the exam until they pass. Table 4.B.7 shows the available skill audit assessment data from fall 2006 to date.

Capstone Project: The Capstone project is part of the two-semester Senior Design Project course. During the first semester of the Senior Design course (EE198A), students complete a team design project proposal, which includes a business plan, an oral design review presentation, and an oral defense of the proposed project. Each student also must complete an individual written report on professional development plans and practice the on-line Senior Skill Audit Exam. During the second semester (EE198B), students implement the group design project (Capstone Project) initiated in EE198A, perform an oral presentation, and complete a written project report. Students also must pass the Senior Skill Audit Examination (with 80% or above) during this semester.
**Table 4.B.7:** Results of Skill Audit Examinations

<table>
<thead>
<tr>
<th>Term</th>
<th>Digital (%)</th>
<th>Solid State (%)</th>
<th>Electromagnetic (%)</th>
<th>Circuits (%)</th>
<th>Systems (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2006</td>
<td>36</td>
<td>27</td>
<td>28</td>
<td>51</td>
<td>42</td>
</tr>
<tr>
<td>Spring 2007</td>
<td>53</td>
<td>41</td>
<td>Missing data</td>
<td>59</td>
<td>65</td>
</tr>
<tr>
<td>Spring 2008</td>
<td>71</td>
<td>70</td>
<td>57</td>
<td>87</td>
<td>73</td>
</tr>
<tr>
<td>Fall 2008</td>
<td>65</td>
<td>70</td>
<td>53</td>
<td>80</td>
<td>63</td>
</tr>
<tr>
<td>Spring 2009</td>
<td>81</td>
<td>79</td>
<td>69</td>
<td>92</td>
<td>79</td>
</tr>
<tr>
<td>Fall 2009</td>
<td>83</td>
<td>85</td>
<td>70</td>
<td>99</td>
<td>88</td>
</tr>
<tr>
<td>Spring 2010</td>
<td>69</td>
<td>69</td>
<td>60</td>
<td>92</td>
<td>70</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>80</td>
<td>76</td>
<td>75</td>
<td>94</td>
<td>77</td>
</tr>
<tr>
<td>Spring 2011</td>
<td>87</td>
<td>83</td>
<td>82</td>
<td>94</td>
<td>80</td>
</tr>
</tbody>
</table>

**Notes:** Fall 2007 data is lost due to changing from webct to blackboard. Starting spring 2008, students can take the exam multiple times until they get the questions.

**Team Evaluation:** In the Senior Design Project course, students evaluate themselves and the effectiveness of their teammates in contributing to their common senior project. The evaluation is performed by filling out individual survey forms and having a discussion section about teamwork management and contribution in the project proposal and project report.

**Junior and Senior Surveys:** The Junior survey is conducted at the beginning of a student’s junior year. This is the entry point to the EE program for most students who transfer from two-year community colleges. Results from this survey give a base line data on later survey results. The Senior survey is conducted at the end of a student’s senior year. This survey assesses the student opinions about the whole program based on the Student Outcomes. The Junior and Senior survey results are included in the Appendix G of this report.

The process of using assessment data to evaluate Student Outcome, defining the level of outcome achievement, and recommending action items for the improvement of Student Outcome is documented in the champion reports. All champions’ recommendations are discussed and reviewed during the department ABET retreats and final action items are documented in the meeting minutes.

**4.B.3 The Student Outcome Assessment Process**

For this AE/E cycle the EE department decided to use only direct assessment data for evaluating Student Outcomes. Several courses were identified by the course coordinators and the outcome champions. The assessment data of these courses was used by the outcome champion to evaluate performance of a particular outcome. After the faculty identified the courses for each particular Student Outcome, the outcome champion then performed an evaluation based on these course assessment data. The outcome champions presented their recommendations for curriculum enhancement during the department ABET retreats. The assessment data, evaluation and enhancement recommendations are documented in the Outcome Assessment reports that are included in Appendix H of this self-study report. Table 4.B.8 below shows courses that were suggested by the Department Assessment and Enhancement Committee (AEC) to each outcome champion for direct evaluation of the student outcome. Completed listing of all EE courses are
shown in Tables 5.1 and 5.2 in Criterion 5 of the report. Table 4.B.9 summarizes the assessment methods, expected level of attainment, and the assessment results. Table 4.B.10 summarizes recommendations from the outcome champions. The detailed descriptions of expected level of attainment for each of the student outcome and the detailed results of the evaluation process and analysis that result to these recommendations are described in the champion reports included in Appendix H.

### Table 4.B.8: Course Selected for Direct Assessment of Student Outcomes

<table>
<thead>
<tr>
<th>A</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 110</td>
<td>EE 122</td>
<td>EE 120</td>
<td>EE 198A</td>
<td>EE 122</td>
<td>ENGR 10</td>
</tr>
<tr>
<td>EE 112</td>
<td>EE 124</td>
<td>EE 124</td>
<td>EE 198B</td>
<td>EE 128</td>
<td>EE 198A</td>
</tr>
<tr>
<td>G</td>
<td>h</td>
<td>i</td>
<td>j</td>
<td>k</td>
<td>L</td>
</tr>
<tr>
<td>EE 198A</td>
<td>EE 198A</td>
<td>EE 198A</td>
<td>EE 198A</td>
<td>EE 112</td>
<td>All</td>
</tr>
<tr>
<td>EE 198B</td>
<td>EE 198B</td>
<td>EE 198B</td>
<td>EE 198B</td>
<td>EE 122</td>
<td>Electives</td>
</tr>
<tr>
<td>ENGR 100W</td>
<td>EE 198A</td>
<td>EE 198B</td>
<td>EE 198B</td>
<td>EE 122</td>
<td>ENGR 100W</td>
</tr>
</tbody>
</table>

### Table 4.B.9: Summary of Assessment Methods, Goals, and Assessment Results

<table>
<thead>
<tr>
<th>SO</th>
<th>Method</th>
<th>Goals</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Using student work (quizzes and exams) from EE110 and EE112 courses provided by course instructors</td>
<td>1. At least 60% of students earn 70% or higher scores in Convolution and impulse response 2. At least 60% of students earn 70% or higher scores in Laplace transforms 3. At least 60% of students earn 70% or higher scores in Fourier transform and series</td>
<td>1. Criterion 1 is met in EE110 and it is not met in EE112. 2. Criterion 2 is met in EE110 and it is not met in EE112. 3. Criterion 3 is not met in EE112.</td>
</tr>
<tr>
<td>b</td>
<td>Using student lab notebooks and reports in EE122 and EE124 Laboratories</td>
<td>1. At least 80% of the students are able to demonstrate the ability to use instrumentations 2. At least 80% of the students are able to write a formal laboratory report.</td>
<td>Goals are met but having concern in student ability in data analysis</td>
</tr>
<tr>
<td>c</td>
<td>1. Assess student ability in system design from EE120 lecture midterm exams and final exam, laboratory exercise reports and laboratory midterm, and course final project 2. Assess student ability in component and circuit design from EE124 exams, quizzes, homework assignments, and laboratory projects</td>
<td>1. At least 50% of the students are able to score at least 50% 2. At least 50% of the students are able to score at least 50%</td>
<td>1. Goals are not met for ability in system design 2. Goals are barely met for component and circuit design.</td>
</tr>
<tr>
<td>d</td>
<td>1. Coordinator to grade student business plans in EE198A based on a rubric in management and responsibility control 2. Advisor to grade students individual effort in EE198B</td>
<td>1. 80% of EE198A students meet expectations 2. 80% of EE198B students earn 80% or higher in individual effort</td>
<td>1. Goals are not met 2. Goals are met</td>
</tr>
<tr>
<td>e</td>
<td>– Using exams and laboratory</td>
<td>1. At least 80% of the students are able</td>
<td>1. Criterion 1 is met</td>
</tr>
</tbody>
</table>
Criterion 4 - Continuous Improvement

| f | Coordinator to grade student business plans in EE198A based on a rubric in ethical issues | 80% of EE198A students meet expectations | Goals are not met |
| g | – Coordinator and advisors to grade student business plans, project proposals, and proposal presentations in EE198A  
– Project advisors to grade student project reports and presentations in EE198B  
– All student assignments in ENGR100W (Sp2009) | 80% of students earn 80% or higher scores in EE198A business plans, proposals and proposal presentations, and in EE198B reports and presentation  
80% students meet writing scores in in-class writings, homework, formal research assignment, group written report, and exit exam ENGR 100W | Goals are met in EE198A and EE198B but students need to improve ability in reference citations  
Goals are all met in ENGR 100W |
| h | Senior project students answers questions on these issues in the exit surveys | 80% of the students meet the expectations | Goals are met |
| i | Coordinator to grade student reports in EE198A on their "five year plan" based on a rubric in continue education, professional development, reference citations | 80% of students earn 80% or higher scores | Goals are met but students need to improve ability in reference citations |
| j | 1. Coordinator to grade student proposals addressing contemporary issues based on a defined rubric  
2. All student assignments in ENGR100W (Sp2009) | 1. 100% of students earn 80% or higher scores in EE198A proposals  
2. 80% students meet writing scores in in-class writings, homework, formal research assignment, group written report, and exit exam ENGR 100W | Goals are met in EE198A and ENGR100W |
| k | 1. Using EE112 exam and homework problems to assess the ability of using MATLAB for system analysis and design  
2. Using EE122 exam and homework problems to assess the ability of using PSPICE for solving circuit and for evaluating circuit performance  
3. Using EE122 lab to assess student ability in measuring characteristics of semiconductor devices | 1. At least 75% of the students with 70% or better scores in using MATLAB  
2. At least 70% of the students with 65% or better scores in using PSPICE  
3. At least 80% of the students with 70% or better scores in using instrumentations to measure and model device characteristics | All criteria are met but it was found that the number of students using MATLAB is relatively low |
| l | Samples of student work (laboratory reports) in EE 122 and in senior design project reports (EE198B) | 1. At least 70% of the students are able to use PSPICE in solving a circuit based on a model of a semiconductor device and in measuring its performance  
2. At least 90% of the students are able to identify and solve an engineering problem in areas pertinent to Silicon Valley companies | All criteria are met |
### Table 4.B.10: Summaries of Recommendations from Outcome Champions

<table>
<thead>
<tr>
<th>SO</th>
<th>Courses assessed</th>
<th>Champion Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>EE110, EE112</td>
<td>More tutorial sessions</td>
</tr>
<tr>
<td>a</td>
<td></td>
<td>Less emphasize in Laplace transform in EE112</td>
</tr>
<tr>
<td>a</td>
<td></td>
<td>Focus EE112 on Fourier transform</td>
</tr>
<tr>
<td>b</td>
<td>EE122, EE124</td>
<td>Rewrite cycle in experiment 7 of EE124</td>
</tr>
<tr>
<td>c</td>
<td>EE120, EE124</td>
<td>Revise EE118 and EE120 contents</td>
</tr>
<tr>
<td>c</td>
<td></td>
<td>Simpler system specifications with few components</td>
</tr>
<tr>
<td>c</td>
<td></td>
<td>Additional prerequisites for EE120</td>
</tr>
<tr>
<td>c</td>
<td></td>
<td>Change passing grade for EE120 to C- (instead of D- as default by university)</td>
</tr>
<tr>
<td>d</td>
<td>EE198A</td>
<td>Develop a better diagnostic tool to assess team work</td>
</tr>
<tr>
<td>d</td>
<td></td>
<td>Develop rubrics for advisors to assign individual grade</td>
</tr>
<tr>
<td>e</td>
<td>EE122, EE128</td>
<td>Spend more time in EE128 on problem solving</td>
</tr>
<tr>
<td>f</td>
<td>EE198A, ENGR100W</td>
<td>Remove option of rewriting business plan</td>
</tr>
<tr>
<td>f</td>
<td></td>
<td>Create an advisor evaluation rubric that includes an ethical part</td>
</tr>
<tr>
<td>f</td>
<td></td>
<td>Sp2009/Sp2010 ENGR100W Course Assessment Journal</td>
</tr>
<tr>
<td>g</td>
<td>EE198A, EE198B, ENGR100W</td>
<td>Add a lecture on proper use of references in written proposals and reports into EE198A.</td>
</tr>
<tr>
<td>g</td>
<td></td>
<td>Sp2009/Sp2010 ENGR100W Course Assessment Journal</td>
</tr>
<tr>
<td>h</td>
<td>EE198A, EE198B</td>
<td>A more comprehensive assessment method is required</td>
</tr>
<tr>
<td>i</td>
<td>EE198A, EE198B</td>
<td>Add lecture on the use of reference in technical reports</td>
</tr>
<tr>
<td>j</td>
<td>EE198B, ENGR100W</td>
<td>Develop more comprehensive assessment tools</td>
</tr>
<tr>
<td>j</td>
<td></td>
<td>Sp2009/Sp2010 ENGR100W Course Assessment Journal</td>
</tr>
<tr>
<td>k</td>
<td>EE112, EE122</td>
<td>More MATLAB in EE112</td>
</tr>
<tr>
<td>l</td>
<td>EE198B</td>
<td>Use samples of senior project’s final written reports in outcome assessment</td>
</tr>
</tbody>
</table>

Besides evaluating the Student Outcomes, three additional program criteria for Electrical Engineering are also evaluated by 3 faculty members and reported to the department in similar manners as the Student Outcomes. Courses used to assess the 3 additional EE criteria and recommendations for the improvement of these criteria are summarized in Table 4.B.11. Similarly to the student outcome, the expected level of attainment for each of these criteria and the detailed results of the evaluation process and analysis that result to the recommendations are described in the criteria reports included in Appendix H.

### Table 4.B.11: Summaries of Recommendations for Additional Program Criteria

<table>
<thead>
<tr>
<th>Cr.</th>
<th>Courses assessed</th>
<th>Recommendations based on Spring 2010 report</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>EE102</td>
<td>Inclusion of MATLAB problems in homework</td>
</tr>
<tr>
<td>n</td>
<td>EE110</td>
<td>Overview of mathematical tools and quiz in week 1 of EE110</td>
</tr>
<tr>
<td>n</td>
<td></td>
<td>Work with tutors for practice outside of classroom</td>
</tr>
<tr>
<td>n</td>
<td></td>
<td>Online problems for practice</td>
</tr>
<tr>
<td>o</td>
<td>CMPE46, Phys51, Phys71</td>
<td>Tutoring sessions for basic sciences</td>
</tr>
<tr>
<td>o</td>
<td></td>
<td>Encourage low-score students to review or attend tutoring sessions</td>
</tr>
<tr>
<td>o</td>
<td></td>
<td>Test student knowledge on basic sciences with a quiz in the first lecture of EE97 and EE98</td>
</tr>
</tbody>
</table>
4.C Continuous Improvement

The goal of conducting continuous assessments and analyzing corresponding data is to derive action items to continuously improve our program. Table 4.C.1 below summarizes the role of each assessment method with respect to the enhancement of outcomes and program educational objectives.

<table>
<thead>
<tr>
<th>Assessment Methods Based on</th>
<th>Direct Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Content Comparison &amp; Evaluation</td>
<td>Course</td>
</tr>
<tr>
<td>Course Performance (direct) Student performance in exams, homework assignments, projects, etc...</td>
<td>Course and SO</td>
</tr>
<tr>
<td>Course Evaluation (self) Self-evaluation</td>
<td>Course</td>
</tr>
<tr>
<td>EE101 Exam Scores and percentage passing</td>
<td>Course</td>
</tr>
<tr>
<td>Senior Skill Audit Exam Scores and areas of concern</td>
<td>Course and SO</td>
</tr>
<tr>
<td>Senior Design Project Performance distribution of proposals, write-ups, reports, presentations, self-evaluation</td>
<td>Course and SO</td>
</tr>
<tr>
<td>Team Evaluation Self-evaluation &amp; advisor report</td>
<td>SO</td>
</tr>
<tr>
<td>Area committee discussion Evaluation</td>
<td>Course and SO</td>
</tr>
<tr>
<td>Tutorial program report Evaluation</td>
<td>Course</td>
</tr>
<tr>
<td>DAC meeting Evaluation</td>
<td>SO and PEO</td>
</tr>
<tr>
<td>Junior Survey Satisfaction and important areas</td>
<td>Course and SO</td>
</tr>
<tr>
<td>Senior Survey Satisfaction and important areas</td>
<td>Course and SO</td>
</tr>
<tr>
<td>Alumni Surveys Satisfaction and important areas</td>
<td>SO and PEO</td>
</tr>
<tr>
<td>Employer surveys Satisfaction and important areas</td>
<td>SO and PEO</td>
</tr>
</tbody>
</table>

The course instructor and course coordinator initiate the course improvements and the proposed changes are discussed in appropriate area committee. A final decision is then presented to the faculty during regular department meetings. Actions taken to improve Student Outcomes are based on 3-year AE/E cycle and involve all program constituencies. For each Student Outcome, the improvement is proposed by the outcome champion after s/he completed the evaluation and analysis of outcome assessment data. Final decision of curriculum changes is made by the department faculty during the ABET retreats. Note that for each SO, the direct assessment data can be based on several courses but the proposed improvements for each SO may involve changes in many other courses, projects, department operations, as well as department policies. Similar to the improvement of SOs, the assessment of PEOs is based on 6-year AE/E cycle and involves program constituencies but not the current students. PEO improvement is initiated and decided by the department faculty after the evaluation and discussion of PEO assessment data during the ABET retreats. Note that the proposed improvement for each PEO may involve the reassessment of SOs and changes in courses, projects, department operations, as well as department policies.

The department has continuously improved its curriculum to achieve the program objective of producing quality engineers for our highly competitive Silicon Valley technical community. In this regard, a number of changes have been made since the last ABET visit as summarized in
Table 4.C.2: Curriculum Change from 2007 (after previous ABET Visit)

<table>
<thead>
<tr>
<th>When</th>
<th>Changes/Actions</th>
<th>Initiated by / Participants</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP2007</td>
<td>Prerequisites of the following EE course were changed: 210, 221, 287, 284, 285, 164, 250, 251, 256, 128, 166, 174, and 175</td>
<td>Faculty</td>
<td>The prerequisites of all EE courses were revised during EE departmental meetings</td>
</tr>
<tr>
<td></td>
<td>Experimental course on Design for Testability (DFT) was offered in fall 2007 and proposed to become a permanent course (EE274)</td>
<td>Faculty</td>
<td>Serves an important area in circuit design</td>
</tr>
<tr>
<td>F2007</td>
<td>New syllabi for EE160 and EE161</td>
<td>Communications / DSP Area Committee</td>
<td>Update the contents of the communication system courses. Offer a laboratory with EE 160 (required) course. EE160 covers the basics while EE161 covers advance digital communication systems</td>
</tr>
<tr>
<td></td>
<td>Revise EE112 course contents</td>
<td>Circuits/Systems Area Committee</td>
<td>Course material on the z-transform not properly covered</td>
</tr>
<tr>
<td></td>
<td>Revise EE175 course contents</td>
<td>Electronics Area Committee</td>
<td>Outdated material</td>
</tr>
<tr>
<td></td>
<td>Add IP-level design &amp; hardware to EE179</td>
<td>Electronics Area Committee</td>
<td>Update and modernize curriculum</td>
</tr>
<tr>
<td></td>
<td>Revise EE138 course contents</td>
<td>Digital Area Committee</td>
<td>Outdated material</td>
</tr>
<tr>
<td></td>
<td>Reduce EE118 material</td>
<td>Digital Area Committee</td>
<td>Excessive amount of material</td>
</tr>
<tr>
<td></td>
<td>Modify the passing requirement and procedure of taking Skill Audit Exam</td>
<td>Faculty</td>
<td>Motivate students to improve mastery level of core EE concepts</td>
</tr>
<tr>
<td>S2008</td>
<td>Cadence tool needed in EE166, EE125, and EE223 courses</td>
<td>Electronics Area Committee</td>
<td>To ensure state of the art tool used in electronic design courses</td>
</tr>
<tr>
<td></td>
<td>EE110 will be the only “block”, through EE101, for accessing Junior-level courses other than EE118/120, EE140/142, and EE112</td>
<td>Circuits/Systems Area Committee</td>
<td>Students who fail EE101 and cannot enroll in EE110 have other courses to take in the meantime</td>
</tr>
<tr>
<td>F2008</td>
<td>Develop teaching philosophy in EE98 and EE110</td>
<td>Circuits/Systems Area Committee</td>
<td>To ensure that instructors of different sections use the same teaching principles</td>
</tr>
<tr>
<td></td>
<td>Revision of EE122 and EE124 courses</td>
<td>Electronics Area Committee</td>
<td>Lack of continuity between these courses was raised. Decision to not modify curriculum was reached</td>
</tr>
<tr>
<td></td>
<td>Remove EE101 as prerequisite of EE112</td>
<td>Circuits/Systems Area Committee</td>
<td>EE101 content is more circuit related while EE112 is more analytical</td>
</tr>
<tr>
<td>S2009</td>
<td>Every EE course syllabus contains measurable learning objectives</td>
<td>Assessment coordinator and course coordinators</td>
<td>Facilitate the development of performance criteria and metrics for assessment</td>
</tr>
<tr>
<td></td>
<td>Remove EE110 and EE112 overlap</td>
<td>Champion of Student Outcome A</td>
<td>Remove the redundancy (Laplace transform) between these courses. Teach Laplace transform in EE110 and z-transform in EE112</td>
</tr>
<tr>
<td>When</td>
<td>Changes/Actions</td>
<td>Initiated by / Participants</td>
<td>Rationale</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>EE112: Add MATLAB questions in quizzes and exams</td>
<td>Champion of Student Outcome K</td>
<td>Ability to use modern tools in solving engineering problems</td>
</tr>
<tr>
<td></td>
<td>EE124lab: Develop report writing guidelines</td>
<td>Champion of Student Outcome B</td>
<td>Ensures that data results and their analysis are present in lab reports</td>
</tr>
<tr>
<td></td>
<td>Tutoring sessions for EE110, EE112, EE118, EE140 and MATLAB¹</td>
<td>Faculty</td>
<td>Improve problem solving skills of students</td>
</tr>
<tr>
<td>F2009</td>
<td>EE 180 course will be offered either as a one-unit course or as an elective course with three units</td>
<td>Undergraduate coordinator</td>
<td>Help some students reach the minimum number of credits in order to graduate</td>
</tr>
<tr>
<td></td>
<td>Include ethical part in advisor evaluation rubric for EE198A</td>
<td>Champion of Student Outcome F</td>
<td>Direct assessment tool to evaluate ethical issues</td>
</tr>
<tr>
<td></td>
<td>Add a lecture in EE198A on proper use of references</td>
<td>1. Champion of Student Outcome G</td>
<td>Ability to engage in lifelong learning</td>
</tr>
<tr>
<td></td>
<td>2. Faculty per PEO assess. results</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meet with EE198A Senior Design Project advisors to define direct assessment tools</td>
<td>1. Champion of Student Outcome D</td>
<td>Direct assessment tools for EE198A/B need to be defined and improved to measure communication skills</td>
</tr>
<tr>
<td></td>
<td>2. Faculty per PEO assess. results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2010</td>
<td>Modify EE128 syllabus</td>
<td>Champion of Student Outcome E</td>
<td>Specifically include problem solving skills in the syllabus</td>
</tr>
<tr>
<td></td>
<td>EE102: Add a computer project to increase student interest and performance</td>
<td>Champion of Criterion M</td>
<td>Understand better the basic concepts</td>
</tr>
<tr>
<td></td>
<td>EE110: Overview advanced mathematics</td>
<td>Champion of Criterion N</td>
<td>Ability to use advanced mathematical tools in the solution of engineering problems</td>
</tr>
<tr>
<td></td>
<td>EE97 and EE98: Test students' knowledge on basic sciences with a quiz in the first lecture</td>
<td>Champion of Criterion O</td>
<td>Improve knowledge of basic sciences</td>
</tr>
<tr>
<td>F2010</td>
<td>Change the passing grades for EE120 from D- (default by university policy) to C- (prerequisite in EE198A)</td>
<td>Champion of Outcome C</td>
<td>Design skill sets are mostly contributed from the EE terminal and elective courses.</td>
</tr>
<tr>
<td></td>
<td>Redefine EE technical areas with topics covered and missions</td>
<td>Faculty per PEO assessment results</td>
<td>Improve the effectiveness of technical elective courses and skill sets</td>
</tr>
<tr>
<td>S2011</td>
<td>Revise topics covered in EE technical elective courses</td>
<td>Faculty per PEO and course assessment results</td>
<td>Improve the effectiveness of technical elective courses and skill sets</td>
</tr>
</tbody>
</table>

1. Tutoring sections are currently managed by IEEE Student Chapters under the supervision of the course coordinators and the department chair.

### 4.D Additional Information

Additional materials referenced in Section 4.A, 4.B, and 4.C are included in appendices as mentioned in the above sections.
4.E The College of Engineering Strategic Planning Process

The College of Engineering underwent a strategic planning exercise in 2005, entitled Engineering the Vision. This process resulted in a drive towards improving excellence in the College and set the context for significant capital fundraising. That effort resulted in considerable effort towards improving student success by using external resources to create our Engineering Student Success Center (ESSC). Today, we have top-ranked programs, expert faculty, successful graduates with broad and impressive accomplishments, close ties with Silicon Valley industry, and unique global opportunities for our students. Our College of Engineering is a vibrant educational environment. Now we’d like to move from good to great.

We are now finishing the next phase of Strategic Planning, which we refer to as Engineering 2015. The new plan is the result of a continuous improvement process to ensure that our college strengthens its commitment to core values, prepares for the challenges of the coming years, and engages in a process of moving from good to great. During AY 2009-10, Dean Belle Wei launched the Engineering 2015 Task Force, in order to engage all stakeholders in open dialogue and envision a future based on no-limitation thinking. This task Force completed its work in Spring 2011.

The Engineering 2015 Task Force was a broadly representative committee comprised of COE faculty and staff, an industry representative, a graduate student, and an undergraduate student. It was charged with the responsibility to "...lay a solid foundation for the future and continue maintaining an environment devoted to excellence and research, despite what may appear to be the current adverse financial climate..." While the Task Force has been convened in an adverse financial climate, the scope of its work is rooted in COE's Vision and Mission, not its budget.

The Task Force reviewed the College's Vision and Mission statements developed in 2004 and affirmed that they are current, valuable, and need no revision:

**Vision:** To be a learning community that empowers its students to better the world through innovative applications of engineering knowledge and skills.

**Mission:** To educate new engineers for the new century, who are technically excellent, broadly educated, and socially responsible.

The early meetings of the Task Force involved brainstorming and research as the members asked: In the College of Engineering: What do we do? What are we good at? What are we passionate about? Ideas were elicited from faculty, administration, staff, alumni, students and employers, using focus groups and surveys.

Spring 2010 involved:

- Reviewing core values that are essential to the College.
- Identifying gaps and opportunities to better prepare our students for a changing future landscape.
- Establishing priorities and direction.
- Researching benchmark schools.
- Considering alternative and innovative models.
- Determining strategic strengths to maintain and develop.
Inclusive open communication and collaborative processes were significant. There was a sincere desire and drive to have wide-ranging discussion formats in an inclusive environment. The task force members met together regularly as a team and also formed numerous subcommittees to research and report back on, for example, other campus policies, literature on change management, best practices, lifelong learning, Silicon Valley issues, university issues and data, and COE statistics. There was motivation to realistically appraise alternatives and courses of action. Decision making required information, data, statistics, and abundant participation. They met in forums with faculty, chairs, staff, and students, as well as open forums. This comprehensive approach created synergy.

In a nutshell, we determined what stakeholders most proud of:
· Distinctiveness.
· Hands-on education.
· Diversity and global outlook.
· Silicon Valley connections and spirit.

We are the only public engineering university in this entrepreneurial, high tech, world-renowned Silicon Valley. Students and alumni value the education received here as #1. Alumni, students, staff, and faculty value the hands-on education in the College, the cultural and ethnic diversity, and the Silicon Valley location.

Students appreciate good professors and networking with fellow students, but they would like us to further expand our bridges with Silicon Valley. There were also comments about curriculum not being cutting edge. These issues were explored and plans for addressing them are in the Engineering 2015 Plan.

Three broad categories are the heart of the Engineering 2015 Plan:
· Educational Excellence.
· Faculty Excellence.
· Silicon Valley Connections.

Educational Excellence

For continuous improvement, the following are guiding directives as we continue our forward momentum from good to great in Engineering Excellence:
· Empower students for success through excellence in the major.
· Create a supportive atmosphere of engagement, critical thinking, innovation, and success.
· Develop students into responsible graduates who have a thorough understanding of fundamental engineering theory.
· Provide exemplary student support.
· Maintain – and continue to improve - advising. Focus on early intervention to help students improve early and have a greater chance of success and to make sure that the right students are in our program.
· Achieve 15% improvement in the 6-year graduation rate by 2015.
· Assist incoming students through a Frosh Summer Bridge Program.
Continue to provide opportunities for improved communication between whom?
- Partner **with industry and other college** to benefit student learning and transfer technology.
- Work to incorporate open-ended projects in our required classes to improve life-long learning skills and ease the transition to the “real world.”
- Develop Silicon Valley Capstone Projects.

**Faculty Excellence**

The College of Engineering encourages its faculty members to excel in teaching, research, and service and plans to sponsor new **Faculty Excellence Programs (FEPs)**, to which College faculty members apply on a competitive basis. The funding levels and sources, and specific requirements and metrics are under development for Fall 2011 deployment. To help launch the use of performance metrics in encouraging faculty excellence, the Task Force members suggested a small set of measures and grouped them into four categories: teaching, research, service, and “holistic and other.” Each of the first three categories is further partitioned into Above and Beyond vs. Normal sub-categories. For example:

**Teaching**
- Winning student projects **and** external student competitions.
- Cutting-edge courses.
- Above-and-beyond advising and supervision of master projects.
- Strong record in teaching through pedagogical innovation and leadership.

**Research**
- Above-and-beyond research for the purpose of creating new knowledge.
- External recognition (e.g., grants/awards.)
- Quality and quantity of publications.

**Service**
- Above-and-beyond service to external communities, leadership to professional communities, invited lecturer of external organizations; organize conferences, service committee members or officers of professional societies.
- Long hours with high impact.

**Holistic qualities** based on advancing the College vision through:
- Leadership.
- Collaboration.
- Collegiality.

**Silicon Valley Connections**

**Industry Connections** are vital. These are keys to the **distinctiveness** of our College. The Dean's Silicon Valley Leadership Symposiums have been significant. Expanding these relationships is crucial for who we are as a College. Faculty, staff, students, and alumni appreciate our proximity to Silicon Valley. Alumni, graduate and undergraduate students value industry relevance and are counting on more industry connections. An immediate step is the creation of a multidisciplinary project development team that will work with industry to provide an interdisciplinary senior capstone project that will last for two semesters.
In conclusion, the Task Force looked inward and outward to establish priorities and guidelines to advance the College through Educational Excellence, Faculty Excellence, and strengthening Silicon Valley Connections.
Appendix A: Course Syllabi

Appendix A1: EE Course Syllabi
Appendix A2: (Common) Engineering Course Syllabi
Appendix A3: Lower-Division Math and Science Course Syllabi
A1. EE Course Syllabi

San José State University
Electrical Engineering Department
EE 97 – Introduction to Electrical Engineering Laboratory

Number of Credits: 1
Required or Elective: Required
Pre-/Co-requisite(s): EE98 with grade of C or better
Course Coordinator: Peter Reischl
Instructor & Office: Curtis A. Jones (Eng 255) and Peter Reischl (Eng 263)
Meeting Time: Section 1: Thursday 18:00-20:45. Section 2: Tuesday 13:30-16:15

Course (catalog) Description
Basic instruments and experimental techniques in electrical engineering. Oscilloscopes, function generators, frequency counters and multiple-use meters. Measurements of voltage, current, frequency response, and transient response.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
- LO1 Read circuit schematics (a, b, c, e)
- LO2 Build simple circuits (a, b, c, e)
- LO3 Use DC power supplies, digital multimeters, function generators, and oscilloscopes (a, b, c, e, k)
- LO4 Measure voltage, current, resistance, and frequency response (a, b, c, e, k)
- LO5 Design simple circuits (a, b, c, e)
- LO6 Devise simple experiments (a, b, c, e)
- LO7 Work in a group (d, g, k)
- LO8 Prepare technical documents, lab reports (a, b, d, g, k)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
EE 97 Laboratory Manual, by Ping Hsu [Rev. Fall 2010]
Other Materials
Bound Lab Notebook with printed page numbers
Course Topics

Lab 1  Characteristics of a Practical DC Source
Lab 2  Current vs. Voltage Graph
Lab 2  Current vs. Voltage Graph (continued)
Lab 3  Light Controlled Switch
Lab 4  Oscilloscope and Function Generator
Lab 4  Oscilloscope and Function Generator (continued)
Lab 5  Rectifier and Voltage Regulator (Exp. #1 & #2 only)
Lab 6  Frequency Response
Lab 7  Time Constant, Oscillator and Counter (omit Exp. #3)
Lab 8  Operational Amplifiers
Lab 8  (continued) AM Receiver
San José State University  
Electrical Engineering Department  
EE 98 – Introduction to Circuit Analysis

Number of Credits: 3  
Required or Elective: Required  
Pre-/Co-requisite(s): Physics 51 or 71. Math 133A or Math 123 can be taken concurrently.  
Course Coordinator: Jim Freeman  
Instructor & Office: M. Javad Zoroofchi (Eng 255) and Jim Freeman (Eng 379)  
Meeting Time: Section 1: Tuesday and Thursday 9:00-10:15. Section 2: Tuesday and Thursday 9:00-10:15. Section 3: Monday and Wednesday 10:30-11:45

Course (catalog) Description
Circuit laws and nomenclature, resistive circuits with DC sources, ideal operational amplifier, controlled sources, natural and complete response of simple RLC circuits, steady-state sinusoidal analysis and power calculations.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

- **LO1** Determine voltages and currents of a DC circuit consisting of resistors, current sources, voltage sources, and dependent sources. (a, e, k, l)
- **LO2** Determine Thevenin and Norton equivalent circuit of a DC circuit and find the maximum power output of a DC circuit. (a, e, k, l)
- **LO3** Determine the DC gain and operating point of an OP amp circuit. (a, e, k, l)
- **LO4** Determine the transient response of a first and second order circuit consisting of RLC. (a, e, k, l)
- **LO5** Determine the sinusoidal steady state response of a circuit consisting of RLC. (a, e, k, l)
- **LO6** Determine the power delivered and absorbed by an element in a RLC circuit. (a, e, k, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook  
Other Materials  
Bound Lab Notebook with printed page numbers
Course Topics

- Ohm’s law and Kirchhoff’s laws
- Series and parallel circuits
- Superposition
- Thevenin and Norton Equivalent
- Maximum power transfer
- Nodal and mesh analysis
- Active and op amp circuits
- Capacitors and inductors
- Transient analysis
- Steady state analysis
- AC power
San José State University
Electrical Engineering Department
EE 101 – Circuit Concepts and Problem Solving

Number of Credits: 1
Required or Elective: Required
Pre-/Co-requisite(s): EE98 or equivalent with a grade of "C" or better
Course Coordinator: Ray Chen
Instructor & Office: Ray Chen (Eng 361)
Meeting Time: Friday 9:00-11:00

Course (catalog) Description
Development of skill and proficiency in solving electric circuit problems; techniques for analyzing DC circuits, AC circuits, and transients, and Calculus and Differential Equation problems. Well prepared students should consider credit by examination for this course. Check the E.E. Department web site for schedule and place of the exams. Note that passing the challenge exam does not exempt the student from enrolling in EE101.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
   LO1 Evaluate all voltages and currents for a given circuit (a)
   LO2 Determine Thevenin and Norton equivalent circuit of a given circuit (a, e)
   LO3 Analyze the transient characteristics of a given first and second order circuit (a, e)
   LO4 Analyze sinusoidal steady state response of a reactive circuit (a, e)
   LO5 Evaluate the voltage gain and voltage and current values in a simple op amp circuit (a, e)
   LO6 Calculate power delivered and absorbed by all elements in an RLC circuit (a)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Current EE98 or a Circuits Analysis textbook
Other Materials
http://www.engr.sjsu.edu/electrical/ee101exam.htm
Course Topics

- Ohm’s law and Kirchhoff’s laws
- Series and parallel circuits
- Superposition
- Thevenin and Norton Equivalent
- Maximum power transfer
- Nodal and mesh analysis
- Active and op amp circuits
- Capacitors and inductors
- Transient analysis
- Steady state analysis
- AC power
San José State University
Electrical Engineering Department
EE 102 – Probability and Statistics in Electrical Engineering

Number of Credits: 3
Required or Elective: Required
Pre-/Co-requisite(s): Basic knowledge in calculus and linear algebra. EE112 (with grade C or better)
Course Coordinator: Nader Mir
Instructor & Office: JeongHee Kim (Eng 383)
Meeting Time: Monday and Wednesday 10:30-11:45

Course (catalog) Description
Discrete probability theory. Theory of one and two random variables. Elementary statistics and hypothesis testing. EE Applications.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
LO1 Demonstrate an understanding of set theory and applying it to probability. (a, e, m)
LO2 Analyze conditional probability and develop with tree diagrams. (a, e, m)
LO3 Demonstrate an understanding of discrete random variables (a, b, m, n)
LO4 Demonstrate an understanding of probability mass/density function and cumulative distribution function. (a, b, m, n)
LO5 Demonstrate an understanding of pairs of random variables (a, b, m, n)
LO6 Demonstrate an understanding of mean, variance, standard deviation, and correlation, correlation coefficient (a, m, n)
LO7 Demonstrate an understanding of random vectors (a, e, m, n)
LO8 Demonstrate an understanding of sums of random variables (a, e, m, n)
LO9 Use Matlab tool to analyze experimental data. (b, k, m, n)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Course Topics

- Axioms and set theories. Conditional probability
- Bayes theorem, sequential experiment, tree diagram, counting methods & reliability problems
- Binomial theorem, discrete random variables, PDF and CDF
- Functions of random variable. Mean, variance and standard deviations
- Conditional probability mass functions
- Continuous random variables
- Cumulative distribution function (CDF) and probability density function (PDF)
- Gaussian random variable
- Pairs of random variables: Correlation, covariance, orthogonal, and uncorrelated random variables.
- Conditioning and two Gaussian random variables
- Random vectors and their representation in matrix format
- Multivariate Gaussian distribution. Sums of random variables
- Correlation and power spectral density
San José State University  
Electrical Engineering Department  
EE 110 – Network Analysis

Number of Credits: 3  
Required or Elective: Required  
Pre-/Co-requisite(s): EE 98 (with grade of “C” or better), Math 133A, EE 101, and Eng 1A  
Course Coordinator: Jalel Rejeb  
Instructor & Office: Jalel Rejeb (Eng 377)  
Meeting Time: Monday and Wednesday 16:30-17:45

Course (catalog) Description

Course Learning Outcomes
Upon successful completion of this course, students will be able to
- LO1 Analyze any RLC and/or op-amp circuit driven by standard input function such as steps, ramps, impulses, sinusoids, or exponentials. (a)
- LO2 Perform Frequency analysis of any RLC and/or op amp circuit. (a)
- LO3 Analyze filter circuits, resonance circuits and stability conditions. (a)
- LO4 Be proficient in using Laplace Transform to analyze electrical circuits, in particular RLC circuits with and without initial conditions. (a)
- LO5 Characterize and analyze two-port networks, and transformers, and calculate the relevant parameters. (a)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook

Other Materials
Course Topics

- Resistive Circuits and Thevenin Equivalent Circuit
- Operational Amplifier Circuits
- RLC circuits, KVL & KCL
- Introduction to Laplace Transforms (LT)
- Application of LT to Electric Circuits
- Inverse of LT and Partial Fractions
- Impulse and Step Responses
- Convolution
- System Functions, Poles, Zeros
- Frequency Response and Filtering
- Bode Plots
- Two-port circuits, Impedance and Admittance
- Mutual Inductance
San José State University  
Electrical Engineering Department  
EE 112 – Linear Systems

Number of Credits:  3  
Required or Elective:  Required  
Pre-/Co-requisite(s):  EE98 with a grade of C or better, EE101, Math 133A  
Course Coordinator:  Avtar Singh  
Instructor & Office:  Khosrow Ghadiri (Eng 371)  
Meeting Time:  Monday and Wednesday 15:00-16:15

Course (catalog) Description  

Course Learning Outcomes  
Upon successful completion of this course, students will be able to
- LO1 Analyze a system and determine if it is linear, time-variant, causal and/or stable (a)
- LO2 Perform convolution in the time domain to compute the response of an LTI system (c)
- LO3 Apply the Laplace transform to solve linear differential equations (a, k)
- LO4 Apply Z-transform to solve linear difference equations (a, k)
- LO5 Analyze periodic signals using the Fourier series to determine frequency content (a, k)
- LO6 Analyze signals using the Fourier transform to determine frequency content (a, k)
- LO7 Analyze a linear system transfer function using its poles and zeros (a, k)
- LO8 Determine the frequency response of a system (a, k)
- LO9 Use MATLAB to analyze a system both in the time and in the frequency domains, to do convolution for time domain response of a system, determine frequency response of a system, and analyze a signal in terms of its frequency content (k)

ABET Student Outcomes  
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings  
Textbook

Other Materials  
Course Topics

- Signal operations. Elementary signals
- Systems and their properties. Using MATLAB
- Convolution sum and integral
- LT1 systems, impulse and step response, system representation using differential and difference equations, block diagrams
- Review of Laplace transform
- Fourier Series
- Fourier transform
- Discrete-time Fourier transform
- Discrete-time Fourier transform and FFT
- Z-transform
- Applications in filters
- Applications in control and communication systems
**San José State University**  
**Electrical Engineering Department**  
**EE 118 – Digital Design I**

**Number of Credits:** 3  
**Required or Elective:** Required  
**Pre-/Co-requisite(s):** EE98 with a grade of C or better  
**Course Coordinator:** Chang Choo  
**Instructor & Office:** Chang Choo (Eng 253)  
**Meeting Time:** Monday and Wednesday 10:30-11:45

**Course (catalog) Description**
Boolean algebra and number systems. Combinational and sequential circuits. Realization of logic blocks with standard integrated circuit packages. Design of counters, dividers, registers, arithmetic logic units and algorithmic state machines.

**Course Learning Outcomes**
Upon successful completion of this course, students will be able to

- **LO1** Understand the number system, including binary, octal and hexadecimal numbers, and 2’s complement number representation (a)  
- **LO2** Understand Boolean algebra and to apply various Boolean theorems to prove Boolean identities and to simplify Boolean functions (a)  
- **LO3** Understand the transistor-level structure of TTL and CMOS logic gates and their electrical and timing characteristics (k)  
- **LO4** Construct the K-map from a Boolean expression and to find the minimal SOP/POS forms (a, k)  
- **LO5** Understand Quine-McCluskey algorithm, i.e., to construct the Q-M table, to perform matching iterations to find PIs, and to find essential PIs by either detecting dominance relations or using Patrick function to corresponding Boolean expression (a, k)  
- **LO6** Design moderately complex arithmetic and logic circuits including carry lookahead adder, BCD adder, comparator, multiplier, and to evaluate the resulting performance in terms of gate count and propagation delay (k, l)  
- **LO7** Understand the working of MSI devices including decoders, encoders, and multiplexers, and to design various logic circuits using them (k, l)  
- **LO8** Analyze cross-coupled gates and to identify any metastability (k, l)  
- **LO9** Understand the behavior, timing issues, and internal structure of various flip-flops (RS, JK, D and T) and registers (k)  
- **LO10** Identify and prevent various hazard and timing problems (e, k, l)  
- **LO11** Analyze and design various flip-flop-based state machines (synchronous sequential circuits), including counters and one-hot controller (k, l)  
- **LO12** Understand how PLA, ROM, and modern FPGA work and how to use them to design complex logic circuits (k, l)  
- **LO13** Understand the basics of HDL language, to write a HDL program for various logic circuits and to test their functionality and timing (k, l)  
- **LO14** Use software tools, and instruments to design, debug, test, and evaluate the performance of various logic circuits (k, l)
LO15  Work in a group. In the lab, students are typically divided into two-person groups. All lab modules, except the final project, are group efforts graded as a team (d, g)

LO16  Prepare technical documents (g)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook

Other Materials

Course Topics
- Binary Logic, ICs
- Boolean Algebra
- K-Maps
- Binary Arithmetic
- Introduction to Verilog
- Comparators
- Multilevel Circuits
- Flip-Flops
- Sequential Circuits
- RAM, ROM and memory decoding circuits
- CPU design.
San José State University
Electrical Engineering Department
EE 120 – Microprocessor Based System Design

Number of Credits: 4
Required or Elective: Required
Pre-/Co-requisite(s): EE118 (with grade C or better). EE120 Lab (must be taken concurrently)
Course Coordinator: Thuy T. Le
Instructor & Office: Avtar Singh (Eng 361)
Meeting Time: Monday and Wednesday, 13:30-14:45

Course (catalog) Description
This course covers both software and hardware aspects of 8086/8088 microprocessors and a microcomputer systems, including microprocessor architecture, interfacing signals and devices, interfacing and standard hardware components associated with a microcomputer system. Lab experiments associated with this course involve assembly program development, digital circuit design, circuit building, and testing.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

- LO1 Demonstrate an understanding of the microprocessor architecture, its instructions and addressing modes (a, c, l, o)
- LO2 Analyze a given microprocessor program. Develop an assembly language program for an application (a, b, e, l, n, o)
- LO3 Demonstrate an understanding of the microprocessor signals, bus cycles and timing (a, b, c, o)
- LO4 Design memory system and I/O circuit interfaces for a microprocessor (a, c, l, n, o)
- LO5 Use programmable interface controllers and programmable timers in a digital system design (c, i, n, o)
- LO6 Design a system using an interrupt interface for a microprocessor (c, i, l, n, o)
- LO7 Use debug tool (DEBUG) for exploring microprocessor architecture, software and hardware development (b, k, l, o)
- LO8 Use logic analyzer to understand timing, hardware development and to explore the relationship between hardware and software of a microprocessor system (b, k, l, o)
- LO9 Analyze experimental data and prepare technical reports and documents (b, g)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials

Course Topics

- Introduction to Microprocessors and Microcomputers
- Review of Numbering Systems
- Software Architecture of the 8088 & 8086 Microprocessors
- Assembly Language Programming
- Machine Language Coding
- 8088/8086 Programming
- 8088/8086 Microprocessors and Their Memory and I/O Interfaces
- Memory Devices, Circuits, and Subsystem Design
- The I/O Interfacing Circuits & LSI Peripheral Devices
- Interrupt Interface of the 8088 and 8086 Microprocessors
San José State University  
Electrical Engineering Department  
EE 122 – Electronic Design I

Number of Credits: 4  
Required or Elective: Required  
Pre-/Co-requisite(s): EE110 and related background in circuit analysis, transient and frequency responses  
Course Coordinator: Sotoudeh Hamedi-Hagh (course). M. J. Zoroofchi (laboratories)  
Instructor & Office: David Parent (Eng 355)  
Meeting Time: Monday and Wednesday, 13:30-14:45

Course (catalog) Description  
This course teaches the operation, modeling and analysis of basic electronic blocks and components such as operational amplifiers (opamps), diodes, metal oxide semiconductor (MOS) transistors and bipolar junction transistors (BJTs). The design and characteristics of analog amplifiers and digital inverters are also studied. The laboratory experiments associated with this course involve circuit simulations using SPICE and measurement.

Course Learning Outcomes  
Upon successful completion of this course, students will be able to

LO1 Determine the circuit characteristics for a non-ideal operational amplifier (a, b, e, l)  
LO2 Determine the characteristics of common mode and differential mode inputs (a, b, e, l)  
LO3 Design operational amplifier circuits to meet specific amplification, bandwidth, and CMRR specifications (a, b, c, e, l)  
LO4 Calculate the terminal characteristics of a PN Junction with voltage, current and temperature parameters (a, b, e, l)  
LO5 Analyze and design half-wave and full-wave rectification circuits (a, b, c, e, l)  
LO6 Analyze and design limiting and clamping diode circuits (a, b, c, e, l)  
LO7 Analyze and design zener diode voltage regulating circuits (a, b, c, l)  
LO8 Determine the circuit model parameters of a MOSFET using process parameters (a, b, e, l)  
LO9 Analyze and design MOSFET circuit characteristics for specific DC parameters (a, b, c, e, l)  
LO10 Analyze and design single stage MOSFET amplifiers (a, b, c, e, l)  
LO11 Calculate the circuit parameters of a MOSFET inverter (a, b, e, l)  
LO12 Design CMOS logic gates (a, b, e, l)  
LO13 Determine the circuit model parameters of a BJT using process and data sheet parameters (a, b, e, l)  
LO14 Analyze and design BJT circuit characteristics for specific DC parameters (a, b, c, e, l)  
LO15 Design single stage BJT amplifiers and analyze input impedance, output impedance and gain characteristics (a, b, c, e, l)  
LO16 Design, build and test, as a team, circuits using OpAmps, diodes, MOS and BJT transistors (a, b, c, d, e, l)
LO17  Keep an individual lab notebook (g, l)
LO18  Write laboratory reports on individual projects (e, g, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Microelectronic Circuits, Sedra and Smith, 6th Edition, Oxford University Press
Other Materials
Introductory Electronics Notes, authored by Prof. Hamedi-Hagh

Course topics

- DC Imperfections, Bandwidth Response with Finite Gain, Slew Rate
- Applications of Op-Amps
- Diodes: Device Physics, Biasing, Modeling. Applications. Solar Cells
- MOS transistor devices and modeling. MOS amplifiers. Frequency response. Switching
- BJT transistor devices and modeling. Common-emitter, common-collector and common-base BJT amplifiers
San José State University
Electrical Engineering Department
EE 124 – Electronic Design II

Number of Credits: 4
Required or Elective: Required
Pre-/Co-requisite(s): EE122, EE128 and Engr100W with grades of C or better
Course Coordinator: Sotoudeh Hamedi-Hagh (course), Udo Strasilla (laboratories)
Instructor & Office: Sotoudeh Hamedi-Hagh (Eng 381)
Meeting Time: Monday and Wednesday, 13:30-14:45

Course (catalog) Description
Analysis and design of Analog integrated circuits using Bipolar and CMOS transistors. Topics include current sources, active loads, differential amplifiers, frequency response, frequency compensation, output stages, feedback amplifiers and operational amplifiers.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
LO1 Apply the knowledge of mathematics, science, and engineering in circuit analysis (a)
LO2 Analyze and design integrated amplifier circuits to meet desired needs (c)
LO3 Identify, formulate, and solve engineering problems in analog circuit design (e)
LO4 Demonstrate to use the techniques, skills, and modern engineering tools necessary for engineering practice (k)
LO5 Keep an individual lab notebook (g)
LO6 Write laboratory reports on the individual laboratory projects (d, g)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials
Course Topics

- MOSFETs and their high-frequency small-signal modeling
- BJTs and their high-frequency small-signal modeling
- Current mirrors and differential-pair amplifiers
- Gain and resistance of CS/CE, CG/CB and CD/CC amplifiers
- Op-Amps and OTAs
- Common-mode rejection ratio. Source/Emitter Degeneration Amplifiers
- Series-Shunt feedback analysis
- Frequency compensation. Stability and phase margin
- Short-Circuit and Open-Circuit time constant analysis
- Frequency response of CS/CE, CG/CB and CD/CC amplifiers
- Two-stage Op-Amps
San José State University  
Electrical Engineering Department  
EE 127 – Electronics for Bioengineering Applications

Number of Credits: 3  
Required or Elective: Elective  
Pre-/Co-requisite(s): EE98 with grade of C or better  
Course Coordinator: Mallika Keralapura  
Instructor & Office: Mallika Keralapura (Eng 365)  
Meeting Time: Tuesday and Thursday, 12:00-13:15

Course (catalog) Description
Study of the fundamental concepts of electrical circuits relevant to the use and design of biomedical instruments and devices currently used for patient care using several examples.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

LO1  Explain the basic physiological sources for many biomedical signals (k)  
LO2  Solve fundamental problems involving operational amplifiers (e)  
LO3  Built circuits for operational amplifiers (k)  
LO4  Explain the operational characteristics biopotential amplifiers (k)  
LO5  Build basic biopotential amplifiers and record data for future analysis (e)  
LO6  Record data for data-acquisition equipment for biomedical signals (k)  
LO7  Solve fundamental signal processing problems (e)  
LO8  Explain several biomedical devices and sensors (k)  
LO9  Build some basic sensors and analyze the data (e)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
 Instructor's notes, Mallika Keralapura, 2011 (site: http://www.engr.sjsu.edu/mkeralapura/)  
Other Materials
Bound Lab Notebook with printed page numbers

Circuits, Signals and Systems for Bioengineers by John Semmlow  
Microelectronic Circuits by Sedra and Smith, Prentice-Hall
Course Topics

- Operational amplifiers
- Bio-potential amplifiers
- Basics of signal processing
- Digital biomedical signal acquisition and processing
- Biomedical devices: Glucometer and PPG circuits
- Biomedical sensors. Demo of pressure sensor
- Cell and molecular instrumentation
- Applications of bioengineering
San José State University  
Electrical Engineering Department  
EE 128 – Physical Electronics

Number of Credits: 3  
Required or Elective: Required  
Pre-/Co-requisite(s): MatE 153 with grade of C or better  
Course Coordinator: David Parent  
Instructor & Office: David Parent (Eng 355)  
Meeting Time: Tuesday and Thursday, 10:30-11:45

Course (catalog) Description  
Review of semiconductor theory, Methods of device fabrication, p-n junctions, bipolar junction transistors field-effect transistors (FETS), MOSFETs, equivalent circuits.

Course Learning Outcomes  
Upon successful completion of this course, students will be able to  
LO1 Describe why a device operates as it does. (h)  
LO2 Explain how devices properties (height, length, width, doping, and temperature dielectric constant) affect device performance. (a)  
LO3 Design using analytical equations current gain for a BJT, and VT for a MOSFET. (c)  
LO4 Determine IV characteristic of a device. (a)  
LO5 Show operating regions of a device. (a)  
LO6 Extract device models from measured data. (b)  
LO7 Model devices in spice (LTspice.) (b, k)  
LO8 Explain second order effects in semiconductor devices. (k)

ABET Student Outcomes  
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings  
Textbook  

Course Topics  
- Semiconductor devices models  
- Current-voltage characteristics  
- Semiconductor fabrication process  
- Design issues in the fabrication of semiconductor devices
San José State University  
Electrical Engineering Department  
EE 130 – Electromechanics

Number of Credits: 3  
Required or Elective: Elective  
Pre-/Co-requisite(s): Submission of major form, EE110 and EE140 with grade of C or better  
Course Coordinator: Khosrow Ghadiri  
Instructor & Office: Khosrow Ghadiri (Eng 361)  
Meeting Time: Tuesday and Thursday, 12:00-13:15

Course (catalog) Description  
Magnetic circuits, force calculation, transformers, voice coil motors, DC motors and generators, step motors and brushless DC motors.

Course Learning Outcomes  
Upon successful completion of this course, students will be able to

LO1 Apply prior knowledge acquired through various electromagnetic courses, using motor as learning vehicle (a, e)  
LO 2 Design a voice coil motor for optimum seek time (b, e, l)  
LO 3 Demonstrate the ability to control a stepper motor using a microcontroller and a motor driver (b, e)  
LO 4 Analyze and specify a brushless dc motor (b, e, l)  
LO 5 Illustrate the technique, skill, and modern engineering tool necessary for engineering practice (b, e, l)

ABET Student Outcomes  
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings  
Textbook  
Electromechanical Motion Devices, Hi-Dong Chai, Prentice Hall 1998.  
Embedded C Programming and ATMEL AVR, by Barnett, O'Cull, Cox and O'Cull, Thompson Delmar Learning, 2007  
Other Materials  
Permanent Magnet and Brushless DC Motors, Kenjo and Nagamori, Oxford University  
Brushless Permanent-Magnet and Reluctance Motor Drives, T.J.E.Miller, Oxford Science  
Design with Microprocessors for Mechanical Engineers, A. Kent Stiffler, McGraw-Hill
Course topics

- Maxwell's equations
- Flux lines, magnetic material and permeability
- Torque and voltage factors. Magnetic circuit modeling
- Design of a coil actuator using a magnetic circuit model
- Stepper motor specifications and examples
- Torque-angle curves. Holding, cogging and running torque
- Driver electronics, control systems and typical suppression methods
- Commutation, BEMF detection and inductance sensors
San José State University  
Electrical Engineering Department  
EE 132 – Theory of Automatic Controls

Number of Credits:  3  
Required or Elective:  Required  
Pre-/Co-requisite(s):  EE112 or equivalent with a grade of “C” or better (Differential Equations; La Place Transforms; Transfer Functions; Bode Plots). Also Basic Matrix Algebra; Mechanics and Dynamics

Course Coordinator:  Peter Reischl  
Instructor & Office:  Peter Reischl (Eng 263)  
Meeting Time:  Monday and Wednesday, 16:30-17:45

Course (catalog) Description  
Theory of linear feedback systems. Transfer functions and block diagrams; root-locus techniques; time and frequency analysis techniques; compensation; transducers and servo-system elements.

Course Learning Outcomes  
Upon successful completion of this course, students will be able to

- LO1 Develop the transfer function of a system from the differential equations generated from the physics of the problem (a, k, l)  
- LO2 Specify the transfer function from a state-space description (a, k, l)  
- LO3 Specify the transfer function from the system’s impulse response (a, k, l)  
- LO4 Demonstrate, build, implement, synthesize a transfer function using operational amplifier building blocks (c, e, k, l)  
- LO5 Demonstrate the transient and steady state analysis of a control system (e, k, l)  
- LO6 Describe stability analysis. Predict the performance of a closed loop control system including root locus and steady state frequency response (e, k, l)  
- LO7 Demonstrate and modify the behavior of a control system by reshaping the root locus through the addition of GH zeros (c, k, and l)  
- LO8 Specify the gain in a control system displaying specified damping (c, k, l)  
- LO9 Specify a gain in a control system to make it into an oscillator (c, k, and l)  
- LO10 Design a control system to meet a set of requirements (k and l)  
- LO11 Demonstrate analytically systems functionality and performance of a control system (a, k, and l)  
- LO12 Describe appropriate tests to demonstrate systems capability to meet specific requirements (b, k, and l)

ABET Student Outcomes  
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings  
Textbook  

Other Materials
MATLAB


**Course topics**

- Introduction to Control Systems. Mathematical Modeling of Electrical, Mechanical, and Electromechanical Systems
- Determining the Transfer Function
- Block Diagram Manipulation. Signal Flow Graphs. State Variable Representation
- Time Domain Analysis. Stability analysis of Control Systems. Routh-Hurwitz Root Locus Techniques
- Applications. PID Compensators
San José State University
Electrical Engineering Department
EE 136 – Semiconductor Based Power Electronics

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE124 (may be taken concurrently) or instructor’s consent
Course Coordinator: Peter Reischl
Instructor & Office: Peter Reischl (Eng 263)
Meeting Time: Monday and Wednesday, 18:00-19:15

Course (catalog) Description
Study of power electronic circuits and applications including switch-mode regulators, AC-DC, DC-DC and DC-AC conversion, uninterruptable power supplies, variable speed drives, active filtering and harmonic cancellation; laboratory demonstrations. Applications include electric vehicle propulsion and spacecraft power systems.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
LO1 Analyze power flow with and without harmonics (a)
LO2 Analyze Power Factor in linear and non-linear circuits (a, e, k)
LO3 Analyze DC-DC switch-mode converters, Buck, Boost, Buck/Bust (a, e, k, l)
LO4 Analyze continuous/discontinuous conduction mode (a, k)
LO5 Analyze switching losses, resistive and inductive loads, conduction losses (a, e)
LO6 Analyze state space of the buck converter, transfer function (a, k)
LO7 Analyze DC-AC converter (a, k, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook

Other Materials
MATLAB
Handouts, Reischl
Course topics

- Review of fundamentals including instantaneous power, average power, RMS, harmonics, linear and non-linear circuits, single phase and three phase
- Power Factor in linear and non-linear circuits
- AC-DC Phase Control. DC-DC switch-mode converters
- Step-Down Buck converter. Step-Up Boost converter. Buck/Boost converter
- Continuous and discontinuous conduction modes
- Switching losses, resistive and inductive loads. Conduction losses
- Thermal considerations
- Introduction to snubbers. State-Space averaged model for the Buck regulator
- DC-AC converters, inverters. Switch-mode power circuit layout
- Introduction to adjustable speed drives
- Introduction to uninterruptible power supplies. Active power factor correction
San José State University
Electrical Engineering Department
EE 140 – Principles of Electromagnetic Fields

Number of Credits: 3
Required or Elective: Required
Pre-/Co-requisite(s): Mat 133A, Phys. 52 or 72, English 1A. EE 98 with a grade of C or better
Course Coordinator: Masoud Mostafavi
Instructor & Office: Masoud Mostafavi (Eng 367)
Meeting Time: Tuesday and Thursday, 13:30-14:45

Course (catalog) Description
Static electric and magnetic fields using vector calculus methods. Development of Maxwell’s Equations.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

LO1 Understand vector algebra and vector calculus and perform coordinate transformations. (a, e, n)
LO2 Apply Maxwell’s equations, Coulomb’s Law and Gauss’s Law to calculate electric fields from different charge distributions. (a, e, n)
LO3 Demonstrate the ability to calculate voltages due to electric field distributions, different charge distributions, as well as the electrostatic energy of different charge distributions and fields. (a, e)
LO4 Understand and analyze the electric properties of conductors, dielectrics and boundary conditions between various media types. Solve for the capacitance of various conductor geometries, as well as the resistance of conducting materials. (a, c)
LO5 Analyze boundary-value problems and use Poisson’s and Laplace’s equations to solve for the potential and electric fields of various conductor geometries. Identify problems dealing with method of images. (n)
LO6 Calculate magnetic fields and forces due to different current distributions using Ampere’s Circuital Law and Biot-Savart Law. (a, e)
LO7 Be able to understand and analyze vector magnetic potential, magnetic properties of materials, and magnetic boundary conditions. (a)
LO8 Ability to calculate inductance and magnetic energy for different geometries. (a, e)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials
MATLAB

Course topics

- Maxwell’s equations
- Charge and Current distributions. Coulomb’s Law, Gauss’s Law
- Method of Images. Boundary Conditions
- Poisson’s and Laplace’s Equations. Biot-Savart Law
- Ampere’s Circuital Law.
- Magnetic Vector Potential
- Inductance, Magnetic Energy and Force
San José State University
Electrical Engineering Department
EE 142 – Fields and Waves

Number of Credits: 3
Required or Elective: Required
Pre-/Co-requisite(s): EE 140 with a grade of C or better
Course Coordinator: Masoud Mostafavi
Instructor & Office: Masoud Mostafavi (Eng 367)
Meeting Time: Tuesday and Thursday, 10:00-11:15

Course (catalog) Description
Application of Maxwell’s Equations to time-varying electric and magnetic fields. Plane waves, transmission lines, waveguides, and antennas.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

- **LO1** Understand Faraday’s Law, Displacement current, Continuity equation, Boundary conditions, Maxwell’s equations in complete forms. (a, e, n)
- **LO2** Understand, analyze and solve EM wave fundamentals, Complex numbers and Phasors. (a, e, n)
- **LO3** Understand wave propagation in lossless media, wave polarization. (a, e)
- **LO4** Understand and analyze wave propagation in lossy media, skin depth, good conductor, electromagnetic power, and group velocity. (a, e, n)
- **LO5** Understand, analyze, solve and design transmission lines, transmission line equations, lossless line, voltage reflection coefficient, standing waves, input Impedance, special cases of the lossless line, short-circuited, open-circuited lines, power flow on a transmission line. (a, c, k, l)
- **LO6** Understand, analyze, solve and design transmission lines using the Smith Chart method, Impedance matching including the quarter-wave transformer. (c, k, l)
- **LO7** Understand, analyze and solve wave reflection and transmission, waves at normal incidence, Snell’s Law, Fiber optics, Waves at oblique incidence. (a, e, k)
- **LO8** Understand, analyze and solve antenna fundamentals, the short dipole, antenna radiation characteristics, antenna directivity and gain, Friis transmission formula. (a, e, k, n)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
*Electromagnetics for Engineers*, by Fawaz T. Ulaby, 2005, Prentice Hall
Other Materials
MATLAB

Course topics

- Faraday's law
- Waves and phasors review
- Time-harmonic fields
- Plane-wave propagation in lossless media
- Wave polarization
- Plane-wave propagation in lossy media
- Good conductors and skin depth
- Electromagnetic power
- Transmission lines
- Input impedance
- Short- and open-circuit lines. Impedance matching
- Wave reflection and transmission
- Normal and oblique incidence
- Antenna fundamentals
San José State University  
Electrical Engineering Department  
EE 153 – Introduction to Signal Processing

Number of Credits: 3  
Required or Elective: Elective  
Pre-/Co-requisite(s): EE 112 with a grade of C or better. Knowledge of calculus and linear algebra  
Course Coordinator: Avtar Singh  
Instructor & Office: JeongHee Kim (Eng 377)  
Meeting Time: Tuesday and Thursday, 13:30-14:45

Course (catalog) Description  
Digital signal processing fundamentals, discrete system theory, convolution, DFT, and design of IIR and FIR filters. MATLAB based lab exercises are used for verification of DSP principles, signal analysis, and design of filters for audio signals.

Course Learning Outcomes  
Upon successful completion of this course, students will be able to  
LO1 Represent discrete signals graphically and mathematically using difference equations (a)  
LO2 Apply the sampling theorem to evaluate aliasing and determine the needed for an antialiasing filter.(a)  
LO3 Perform convolution in both time and frequency domains (a)  
LO4 Distinguish between IIR and FIR filters. (a)  
LO5 Determine frequency response for a discrete signal sequence (a)  
LO6 Compute transfer functions for a discrete system and analyze it for poles, zeros, and the associated frequency response. (a)  
LO7 Perform DFT and to determine the frequency contents of a sampled signal. (a)  
LO8 Design basic types of FIR filters using windowing method and IIR filters using analog filter design methods. (c)  
LO9 Analyze an audio signal and determine the filters needed to improve its quality, design the required filters, apply these to the signal and evaluate performance. (a)  
LO10 Use MATLAB’s DSP Toolbox to analyze discrete signals and filters in both time and frequency domain. The ability to use MATLAB to design and evaluate digital filters (k)

ABET Student Outcomes  
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings  
Textbook  
Other Materials
MATLAB
Lab manual (on line)

Course topics

• Sampling
• Quantization
• A/D and D/A conversion
• Digital Signals
• Difference equations and filtering
• Convolution and filtering.
• The Z-transform
• Fourier transform
• Filters
• Digital signal spectra
• DFT and FFT
• FIR filter design
• IIR filter design
• Audio signal processing
San José State University
Electrical Engineering Department
EE 160 – Principles of Communication Systems

Number of Credits: 3
Required or Elective: Required
Pre-/Co-requisite(s): EE 112 with a grade of C or better
Course Coordinator: Robert Morelos
Instructor & Office: Robert Morelos (Eng 373)
Meeting Time: Tuesday and Thursday, 15:00-16:15

Course (catalog) Description

Course Learning Outcomes
Upon successful completion of this course, students will be able to

LO1 Understand methods of analog and digital modulation (a, c)
LO2 Specify and compare components of analog and digital communication systems (c)
LO3 Perform laboratory based operational and measurement criteria for analog and digital communication systems in both time and frequency domains (b)
LO4 Describe baseband and passband signals and explain their associated system implementation (hardware) consequences (c)
LO5 Demonstrate the process of spectral translation (downconversion and upconversion) via narrowband signal analysis and filtering (a)
LO6 Analyze the power spectral density properties of signals in the presence of noise (a, m)
LO7 Analyze filtering mechanisms (e.g., low-pass, bandpass, matched, correlation) and their impact on the performance of a communication system (c, o)
LO8 Understand the complexity interplay in communications systems in terms of circuit and component requirements (o)
LO9 Interpret and report on computer-based performance predictions of analog and digital (binary) modulation systems (k)
LO10 Understand the impact of noise on communication system performance (k)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials
Proakis, Salehi and Bauch, Contemporary Communication Systems Using Matlab, 2nd ed.,

**Course topics**

- Nonlinearities and harmonics
- Review of Fourier series and transform
- Sampling process
- Amplitude modulation (up-conversion)
- Amplitude demodulation (down-conversion)
- Superheterodyne receiver
- Frequency modulation
- Binary line coding and spectral shaping
- Binary transmission
- Amplitude-shift keying (ASK) modulation
- On-off keying (OOK) modulation
- Frequency-shift keying (FSK) modulation
San José State University
Electrical Engineering Department
EE 161 – Digital Communication Systems

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE 102 with a grade of C or better
Course Coordinator: Robert Morelos
Instructor & Office: Robert Morelos (Eng 373)
Meeting Time: Tuesday and Thursday, 12:00-11:15

Course (catalog) Description
Introduction to communication systems and noise. Binary communication systems. Pulse
amplitude modulation. Digital modulation of amplitude, phase and frequency of a carrier signal.
Modulation and signaling for wireless communication channels. Digital wireless communication
using multiple antennas.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
LO1 Describe baseband and passband signals and explain their associated system
implementation (hardware) consequences (a, c)
LO2 Demonstrate spectral translation (downconversion and upconversion) via narrowband
signal analysis and filtering (a)
LO3 Analyze signals (vector representation and power spectral density) in the presence of
noise (a, m)
LO4 Analyze filtering mechanisms (e.g., low-pass, bandpass, matched, correlation) and
their impact on the bit-error rate (BER) performance of a digital communications
system (a, m)
LO5 Identify, formulate and solve engineering problems that arise in communications
systems analysis and design (a, e)
LO6 Interpret and report on computer-based performance predictions of analog and binary
modulation systems (a, e)
LO7 Practice tradeoff analyses of signal-to-noise ratios, BER and achievable data rate for
digital communication systems (a, e)
LO8 Predict the performance of both wired and wireless digital communications
systems (a, e)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student
Outcomes.

Required Texts/Readings
Textbook

Other Materials

**Course topics**

- Binary modulation
- M-PAM modulation
- M-ary digital modulation
- Error control coding
- Wireless channels and signaling for flat multipath fading channels
- Signaling for frequency-selective multipath fading channels
- Diversity concept and performance
- RAKE demodulation
- OFDM systems
- MIMO systems
San José State University
Electrical Engineering Department
EE 166 – Design of CMOS Integrated Circuits

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE128 with grade of C or better
Course Coordinator: David Parent
Instructor & Office: Rochit Rajsuman (Eng 353)
Meeting Time: Tuesday and Thursday, 12:00-13:15

Course (catalog) Description
Analysis and design of CMOS digital integrated circuits (IC); design and analysis of static CMOS logic gates and circuits; introduction to industrial CAD tools for the design and analysis of IC.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
  LO1 Design and analyze simple combinatorial and sequential circuits (a, c, e)
  LO2 Explain layout styles of combinatorial and sequential circuits and technology scaling principles (k, l)
  LO3 Understand the operation and efficient use of the industrial CAD tool for IC design (k, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials
Michael Smith, Application Specific Integrated Circuits
Wayne Wolf, Modern VLSI Design
John Uyemura, CMOS Logic Circuit Design
Course topics

- Semiconductor energy band, effect of doping, mobility of charge carriers, p-n junction, p-n-p junction, MOSFET structure
- Detailed MOSFET operation, effect of substrate bias, impact on threshold voltage, channel length modulation, MOSFET modeling
- CMOS Inverter, DC and transient characteristics, transistor sizing, effect of $\beta_n/\beta_p$, noise margins, latch-up
- CMOS logic gates, NAND, NOR, CMOS pass transistor logic. Switch model
- CMOS Circuit Manufacturing, general process steps, masks making
- CMOS circuit layouts, stick diagrams, layout design styles, CMOS cell design
- CMOS complex gates, half and full adders, half and full subtractor
- Circuit performance, resistance estimation, capacitance estimation. Delay using RC model, transmission line, transistor chain
- Rise and fall times in CMOS gates, switching delay. Gate delay, methods to improve Gate delay
- Power consumption, static and dynamic power, power-delay product, Miller effect
- CMOS Latches and flip-flops, clocking and skew. CMOS scaling
San José State University
Electrical Engineering Department
EE 167 – Microelectronic Manufacturing Methods

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE128 with grade of C or better
Course Coordinator: David Parent
Instructor & Office: David Parent (Eng 355)
Meeting Time: Tuesday and Thursday, 9:00-10:15

Course (catalog) Description
CMOS manufacturing methods; advanced processing for integrated circuits. Analysis of yield, statistical process control and design of experiments as applied to process design, integration and characterization.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
   LO1  Design and analyze CMOS circuits (a, c, e)
   LO2  Explain layout styles of combinatorial and sequential circuits and technology scaling principles (k, l)
   LO3  Understand the operation and efficient use of the industrial CAD tool for IC design (k, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook

Other Materials

Course topics

- CMOS Inverter Modeling, Layout and Physics
- CMOS Processing Modeling
- T-CAD Modeling
- Metrology
- Team Work
- Process Control
San José State University
Electrical Engineering Department
EE 172 – Introduction to Microwave Engineering

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE 142 with a grade of C or better
Course Coordinator: Masoud Mostafavi
Instructor & Office: Ray Kwok (Eng 377)
Meeting Time: Tuesday and Thursday, 12:00-11:15

Course (catalog) Description
Introduction to microwave engineering and techniques. Transmission lines and waveguides, microwave network analysis. Impedance matching and timing. Resistors, dividers, couplers.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

LO1 Visualize the abstract electromagnetic wave pattern and express it in terms of equivalent circuit (a, e, k)
LO2 Perform circuit analysis using various mathematical models and techniques (a, b, e, k)
LO3 Read & Construct standard microwave specifications for common devices (b, c, d, e, g, j, k, l)
LO4 Design matching network for any device to maximize its performance in the system (a, b, c, e, k, l)
LO5 Specify the correct type of transmission line and dimensions needed for the specific system requirements (a, c, e, k, l)
LO6 Analyze the moving and resonant in transmission lines (a, c, e, k, l)
LO7 Design resonators for oscillator or filter applications (a, c, d, e, g, k, l)
LO8 Design simple passive microwave circuits with and without design CAD tools (a, c, e, k, l)
LO9 Acquire basic but critical laboratory knowledge necessary for the understanding of theoretical and practical problems (b, f, k, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Microwave Engineering, David Pozar (Wiley & Sons).

Other Materials
Foundation for Microwave Engineering, Robert E. Colin (McGraw-Hill)
Fields and Waves in Communication Electronics, Ramo, Whinnery & Van Duzer
Fundamentals of Engineering Electromagnetics, David K. Cheng (Addison-Wesley)
Introduction to Electrodynamics, David J. Griffiths (Prentice Hall)
Course topics

- Transmission Line Theory
- Impedance Matching
- Smith Chart
- CAD
- Network and Matrix
- Wideband matching
- Waveguides
- Resonators
- Passive devices
San José State University  
Electrical Engineering Department  
EE 174 – Operational Amplifiers

Number of Credits: 3  
Required or Elective: Elective  
Pre-/Co-requisite(s): EE 122 with a grade of C or better  
Course Coordinator: Khosrow Ghadiri  
Instructor & Office: Khosrow Ghadiri (Eng 371)  
Meeting Time: Tuesday and Thursday, 7:30-8:45

Course (catalog) Description
Voltage amplifier, converters, oscillators, filters, integrated circuits and subsystems, gain and bandwidth, design examples.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
   LO1 Analyze and design circuits using operational amplifiers, either alone or in conjunction with diodes, BJTs, and FETs (b, c, l)
   LO2 Apply prior knowledge acquired through various courses, using the op amp as learning vehicle (a)
   LO3 Recognize the key op amp practical limitations and the way they affect the performance of the basic inverting and non-inverting amplifier configurations, in particular (b, c)
   LO4 Design of a wide range of basic electronic circuits involving the use of the general purpose operational amplifier to meet given requirements and specifications (b, c, l)
   LO5 Illustrate the technique, skills, and modern engineering tools necessary for engineering practice (b, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Course topics

- Amplifiers
- Converters and comparators
- Voltage regulators. Limiters. Peak detectors
- D/A converters
- DC/Pulse sources
- Sine-wave and rectangular-wave oscillators
- The 555 timer
- First-order filters
- Girator filters
- IGMF/IGSF filters
- State-variable filters.
- Finite gain and bandwidth
- Input and output resistance
- Stability
San José State University
Electrical Engineering Department
EE 177 – Digital System Interfacing

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE 120 with a grade of C or better. Basic knowledge in computer programming
Course Coordinator: Thuy Le
Instructor & Office: Tri Dinh (Eng 377)
Meeting Time: Monday and Wednesday, 13:30-14:45

Course (catalog) Description
System hardware and software; Bus design and timing, processor and local buses, bridge and bus hierarchy, fault-tolerant; Parallel, serial and Internet communication. RS232, USB, SATA, GPIB, PCI, SCSI, A/D and D/A. System design process, design entry, signal integrity, PCB testing.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

LO1 Demonstrate an understanding of a microprocessor-based system architecture, its interfaces. (a, c, l)
LO2 Analyze a microprocessor program and develop an C++ language programs for system interfacing (a, b, e, l)
LO3 Demonstrate an understanding of the bus design including signals, cycles and bus timing (a, b, c)
LO4 Demonstrate an understanding of the standard buses that are using in industrial. (a, c, k, l).
LO5 Design an I/O subsystem that interface to a microprocessor-based system. (a, b, c, d, g, k, l)
LO6 Use design entry tools (Verilog, ORCAD) for exploring microprocessor architecture, and hardware development (b, k, l)
LO7 Demonstrate an understanding of the data acquisition, relations between analog and digital circuit. (a, b, c, d)
LO8 Use hardware tools as oscilloscope, logic analyzer for understanding timing, hardware development, and for exploring the relationship between hardware and software digital systems (b, d, k, l)
LO9 Analyze experimental data and prepare technical reports and documents (b, g)
LO10 Understand industrial processes to design, test and manufacturing a product. (k, l)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials
ORCAD, MS Visual C++
Data Sheets and Application Notes

Course topics

- Logic design review
- Signal and bus design
- Memory design
- Error and Fault-Tolerant in Memory System, ECC
- PCI Bus Protocol
- PCI-X
- PCIe Protocol.
- PCB Design Process
- Add-in Ethernet Board Design
- Serial Interfacing: RS-232, UART, I2C, USB
- USB Protocol
- ADC and DAC
- High-Speed System Design Issues
San José State University
Electrical Engineering Department
EE 178 – Digital Design with FPGA's

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE 118 with a grade of C or better. Basic knowledge in computer programming
Course Coordinator: Tri Caohuu
Instructor & Office: Tri Caohuu (Eng 375)
Meeting Time: Monday and Wednesday, 19:30-20:45

Course (catalog) Description
This class covers advanced digital design technologies as they relate to synchronous digital systems. Students are required to do lab projects using of CAD tools for the design, simulation, and implementation of systems with FPGA's.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

- LO1 Demonstrate the ability to develop a synchronous digital logic design, from a specification, for implementation in a field programmable gate array (c, o)
- LO2 Demonstrate the ability to do design entry using HDL language (c, e)
- LO3 Demonstrate the ability to use recent CAD tools for simulation, synthesis, implementation, static timing analysis, and hardware programming (e)
- LO4 Demonstrate the ability to efficiently partition and structure a design into control and data path sections and to take advantage of hierarchical design (e)
- LO5 Demonstrate the ability to correctly specify and design synchronous finite state machines, using a variety of modeling styles (c)
- LO6 Understand the concept of hardware/software co-design (a, o)
- LO7 Describe programmable logic devices, their uses, and their internal structures, including boundary scan, vendor specific primitives, and the configuration process (e)
- LO8 Interpret and report the results of technical experiments (b, g)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials
Xilinx Spartan-3E Starter Kit ($149) http://www.digilentinc.com
Xilinx ISE WebPack 10.1 with Service Pack:
http://www.xilinx.com/products/design_resources/design_tool/
Lab handouts
Course topics

- FPGA-Based Systems
- FPGA Fabrics
- Introduction to Verilog HDL
- Architecture
- Register-transfer and behavioral design
- Pipelining
- Design methodology
- Design verification
- Large-Scale systems
- Buses
- Platform FPGAs
- Multiple-FPGA systems
- Novel FPGA architectures
San José State University
Electrical Engineering Department
EE 181 – Fundamentals of Internetworking

Number of Credits: 3
Required or Elective: Elective
Pre-/Co-requisite(s): EE 118 with grade of C or better
Course Coordinator: Nader Mir
Instructor & Office: Nader Mir (Eng 251)
Meeting Time: Monday and Wednesday 10:30-11:45

Course (catalog) Description
Data communication concepts, protocols, algorithms; 7-layer OSI reference model and implementations; physical media (fiber, wire); switching systems; Local Area Network (LAN) architectures and components, Ethernet, FDDI, TCP/IP, and related standards.

Course Learning Outcomes
Upon successful completion of this course, students will be able to

LO1 Analyze and differentiate the two types of computer communication networks: connection oriented and connectionless strategies (a)(e)
LO2 Describe the fundamental Internet protocols: OSI and TCP/IP protocol stacks (a)
LO3 Analyze IPv4 and IPv6 addressing schemes (a)
LO4 An ability to design basic networks using Physical Layer devices as MODEMS and basic networking devices such as multiplexers, repeaters, hubs, bridges, and routers (b)
LO5 Identify, formulate and solve error control methods at the link layer such as CRC (a)(e)
LO6 Analyze flow control methods at the link layer such as sliding window (a)(e)
LO7 Analyze basic local area networks, Ethernet, for applications in campuses and buildings (a)(b)(e)
LO8 Analyze link layer issues for LANs: MAC addresses, multiple access methods (a) (e)
LO9 Identify, formulate and solve packet routing algorithms (a)(b)(e)(k)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Other Materials
IEEE Communications Magazine
IEEE Network Magazines
Course topics

- Packet-Switched Networks Fundamentals
- Foundation of Internet Protocols: OSI and TCP/IP Reference Models
- Networking Devices, Routers, and Physical Layer Devices
- Links and Transmission Systems
- Local Area Networks, and Networks of LANs architectures
- Routing and Route Blocking Estimation
- Advanced Topics in Networks (Transport/Applications/Security)
San José State University
Electrical Engineering Department
EE 182 – Electronics Test Design Engineering I

Number of Credits: 3
Required or Elective: Required
Pre-/Co-requisite(s): EE 124 with a grade of C or better
Course Coordinator: David Parent
Instructor & Office: Rochit Rajsuman (Eng 353)
Meeting Time: Monday and Wednesday, 10:30-11:45

Course (catalog) Description
Introduction to Test Design Engineering; Basic IC and Component measurements; Measurement accuracy, Correction, and Calibration; DSP based testing; Design for Test; Laboratory Bench Test development and execution.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
LO1 Analyze and solve new problems encountered due to evolving design and manufacturing technologies (e)
LO2 Develop deeper understanding of the area of mixed-signal test (a, b)
LO3 Understand Device-Under-Test (DUT) types and objectives (b)
LO4 Understand parametric, functional and structural fault models (a, b)
LO5 Specify a test plan with specifications, inputs and expected outputs (a, b, e, k)
LO6 Understand parametric, DC and AC tests (e, k)
LO7 Identify test instruments and automatic test equipment (ATE), Hi-fix, probe cards (k, l)
LO8 Design a Load Board or Device Interface Board (DIB) (e, k)
LO9 Specify an ATE architecture, tester resources, strobe, timing and waveforms (e)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
Mark Burns and Gordon Roberts, An Introduction to Mixed signal IC Test and Measurement
Course topics

- Introduction: Necessity of testing, faults, failures and errors
- Test economics: Cost of test at wafer-level, packaged IC, at board level, in system, cost of field failure
- Device-Under-Test (DUT) types and objectives of test
- Objectives for performance and long term reliability testing
- Fault models: Parametric, functional and structural fault models, transistor level fault models, fault equivalence and dominance
- Test specifications. Test plan development, conversion of data-sheet specifications into test specifications
- Test inputs (test stimuli): Test conditions and inputs for performance and reliability testing
- Expected outputs. Measurement.
- Parametric, DC and AC tests
San José State University
Electrical Engineering Department
EE 198A – Senior Design Project I

Number of Credits: 1
Required or Elective: Required
Pre-/Co-requisite(s): Electrical Engineering Senior in good standing, Engr100W, EE120, EE122, EE128
Course Coordinator: David Parent
Instructor & Office: David Parent (Eng 355)
Meeting Time: Friday 12:00

Course (catalog) Description
Individual or group design project proposal and initial design in approved E.E. area; oral and written reports; professional seminar.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
LO1 Design a system, device or component (c, k)
LO2 Fabricate a system, device or component (c, k)
LO3 Test a system, device or component(c, k)
LO4 Work in a team. (d)
LO5 Research an Electrical Engineering topic (i, j)
LO6 Write individual engineering reports (g)
LO7 Write final Engineering Team reports (g)
LO8 Orally present Engineering ideas and results (g)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
None
Other Materials
- Analog Circuit: 124, 125, (129 or 167)
- Digital Circuit Design: 176, 177, 178
- Signal Processing: 153, 161
- Integrated Circuit: 129, 166, 167
- MEMS: 129, 169
- Electromagnetic microwave: 172, 196Z
- Control/ Power Systems: 130, 132
Course topics

- Written Final Proposal
- Business Plan
- Oral Presentation
San José State University
Electrical Engineering Department
EE 198B – Senior Design Project II

Number of Credits: 3
Required or Elective: Required
Pre-/Co-requisite(s): EE 198A with a C or better
Course Coordinator: David Parent
Instructor & Office: David Parent (Eng 355)
Meeting Time: At end of semester for oral presentation of project

Course (catalog) Description
Implementation of individual or group design projects initiated in EE 198A. Oral and written reports.

Course Learning Outcomes
Upon successful completion of this course, students will be able to
LO1 Design a system, device or component (c, k)
LO2 Fabricate a system, device or component (c, k)
LO3 Test a system, device or component (c, k)
LO4 Work in a team. (d)
LO5 Research an Electrical Engineering topic (i, j)
LO6 Write individual engineering reports (g)
LO7 Write final Engineering Team reports (g)
LO8 Orally present Engineering ideas and results (g)

ABET Student Outcomes
The letters in parentheses in the Course Learning Outcomes above refer to ABET Student Outcomes.

Required Texts/Readings
Textbook
None

Course topics
- Demonstration of a Project Design
- Written Final Report
- Oral Presentation
A2. (Common) Engineering Course Syllabi

General Engineering Department
ENGR 10 – Introduction to Engineering

1. Required Course
2. Catalog Description
   Introduction to engineering through hands-on design projects, case studies, and problem-solving using computers. Students also acquire non-technical skills, such as team skills and the ability to deal with ethical dilemmas. 3 units
3. Prerequisite: Open to all majors; high school algebra, geometry and trigonometry
4. Textbook: none
   All lecture notes, lab handouts, homework assignments, and supplemental reading are available at www.engr.sjsu.edu/E10.
5. Course Coordinator: Ping Hsu
6. Learning Outcomes:
   At the end of this course students will be able to:
   Summarize the steps of the engineering design process
   Apply teamwork skills and resolve team conflict
   Write a simple engineering report and present the report orally
   Use tools such as spreadsheets, C++ programming, and CAD software to support engineering design and analysis
   Use ethical reasoning to address to evaluate ethical dilemmas
   Explain principles of sustainability and how they affect engineering design
   Recognize the value of participation in professional activities
7. Topics Covered
   • The engineering profession
   • Engineering tools (Excel, Solid Modeling, C++ programming)
   • The design process
   • Communication skills (report writing and oral presentations)
   • Team skills
   • Sustainability
   • Global and environmental issues
   • Engineering ethics
   • Student success
8. Class Schedule: Two 1-hour lectures/one 3-hour lab each week.
9. Contribution of course to meeting the professional component
   • college-level mathematics and basic sciences—0 credits with experimental experience—no
   • engineering topics—3 credits
   • general education—0 credits
## 10. ABET Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Level (N, L, M, H)</th>
<th>Demonstrate Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to apply knowledge of mathematics, science, and engineering</td>
<td>M</td>
<td>Homework, Quizzes, Final Exam</td>
</tr>
<tr>
<td>Ability to design and conduct experiments, as well as to analyze and interpret data</td>
<td>L</td>
<td>Project Reports</td>
</tr>
<tr>
<td>Ability to design a system, component, or process to meet desired needs within realistic constraints</td>
<td>H</td>
<td>Activity reports, Project reports</td>
</tr>
<tr>
<td>Ability to function on multi-disciplinary teams</td>
<td>H</td>
<td>Activity Reports, Team Assessment</td>
</tr>
<tr>
<td>Ability to identify, formulate, and solve engineering problems</td>
<td>L</td>
<td>Homework</td>
</tr>
<tr>
<td>Understanding of professional and ethical responsibility</td>
<td>H</td>
<td>Homework, Final Exam</td>
</tr>
<tr>
<td>Ability to communicate effectively</td>
<td>M</td>
<td>Written reports, Oral Presentations</td>
</tr>
<tr>
<td>Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</td>
<td>L</td>
<td>Final Exam</td>
</tr>
<tr>
<td>Recognition of the need for, and an ability to engage in life-long learning</td>
<td>L</td>
<td>Not assessed</td>
</tr>
<tr>
<td>Knowledge of contemporary issues</td>
<td>M</td>
<td>Quizzes, Final Exam</td>
</tr>
<tr>
<td>Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</td>
<td>M</td>
<td>Homework, Project reports</td>
</tr>
</tbody>
</table>

Prepared by: Thalia Anagnos

May 31, 2011
CMPE 46 – Computer Engineering I

**Designation:** “Required”  
**Credits:** Three semester units  
**Class Schedule:** Lecture: 2 sessions per week. 50 minutes each lecture.  
Lab: 2 sessions per week, 3 hrs each lab.

**Instructor’s Name:** Rod Fatoohi


**Course Description:** Introduction to computing and computer engineering; problem solving with structured and object-oriented programming using the C++ language.

**Prerequisites:** ENGR 010, MATH 030.

**Course Goals and Student Learning Objectives:**  
Acquiring problem-solving, technical critical thinking and reasoning skills.  
Understanding and using the C++ language as a software development tool.  
Understanding and using a common software development environment.  
Designing, implementing, and testing object-oriented programs.

**Course Content Learning Outcomes:** Upon completion of the course, students will be able to do the following:  
- Have the ability to identify, formulate and solve simple text-based problems with C++.  
- Have the ability to write text-based C++ programs to meet the needs of project assignments.  
- Have the ability to use Visual C++ to develop and test text-based software programs.

**Topics Covered:**

<p>| 1. Intro to Computers &amp; Programming |<br />
|------------------------------------|---|---|---|---|
| Intro to C++                        |   |   |   |   |
| Expressions &amp; Interactivity     |   |   |   |   |
| Making Decisions                   |   |   |   |   |
| Looping                            |   |   |   |   |
| Functions                          |   |   |   |   |
| 2. Intro to Classes &amp; Objects      |   |   |   |   |
| Arrays                             |   |   |   |   |
| Searching, Sorting &amp; Algorithm Analysis |   |   |   |   |
| Pointers                           |   |   |   |   |</p>
<table>
<thead>
<tr>
<th>More about Classes &amp; O-O Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>More about Characters, Strings &amp; string class</td>
</tr>
<tr>
<td>Advanced File &amp; I/O Operations</td>
</tr>
<tr>
<td>Exceptions</td>
</tr>
</tbody>
</table>

**Lab**
1. Work individually
2. You can use your own laptop or one of lab computers
3. You access lab during lab hours only
4. You need to use Visual Studio C++
5. There will a lab assistant in addition to the instructor
6. No late submission or demo.
7. Expect questions during demo.
8. You need to submit a hard copy in class and soft copy to Turnitin.com

**Project**
- Team project of two students
- Individual contribution should be clearly stated
- Project(s) will be assigned later on
- No late submission or demo
- You need to submit a hard copy in class and soft copy to Turnitin.com

**Relationship of Course to Program Outcomes:** The course contributes to program outcomes as follows:
- Acquiring problem-solving, technical critical thinking and reasoning skills.
- Understanding and using the C++ language as a software development tool.
- Understanding and using a common software development environment.
- Designing, implementing, and testing object-oriented programs.

**Contribution of Course to Meeting the Professional Component:**
- Understanding structure-oriented programming in C++
- Understanding object-oriented programming in C++
- Coding in C++

**Prepared by:** Dr. Rod Fatoothi  
**Format Updated by:** Dr. Jerry Gao  
**Date:** Spring 2010
ENGR 100W
Engineering Reports on the Earth and Environment

Syllabus prepared by Dr. Jeanne Linsdell and Dr. Patricia Backer, May 27, 2011

ENGR 100W is required of all engineering students, in all engineering majors. This is an SJSU Studies course that satisfies Area Z, Written Communication II, and Area R, the Earth and Environment. SJSU Studies (formerly Advanced GE)

**ABET Outcomes A- K Supported:**
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively

**Contribution of course to meeting the professional component for MatE:**
This course consists mainly of engineering science although there are a few elements of engineering design sprinkled throughout the course assignments and laboratory exercises. The material in the course is on electronic and magnetic materials used in engineering applications, with particular emphasis on semiconductor materials and devices. Introductory level quantum mechanics and differential equations are used to describe various phenomenon in materials used in electrical and magnetic and optical devices and systems.

**Catalog Description:**
Regular technical writing assignments and company-focused oral presentations while integrating effects of environmental factors as they relate to products, systems and engineering processes.

**Prerequisite:**
ENGL 1B (with a grade of C or better); Completion of core GE, satisfaction of Writing Skills Test and upper division standing.

**Class/laboratory schedule:**
Each class meets three times a week -- twice with the instructor (lecture and lab over two separate days in room #392), plus all sections of ENGR 100W meet together on Wednesdays at noon (12:00 - 1:15) for the Environmental Speaker Series: GREENTALK. These are held in room #189, the Engineering auditorium.

**Required Textbook:** (One environmental science text and one technical writing text)
Beford/St.Martin’s. (9th ed. available on iBooks for $45)
Research articles, environmental readings, and exemplary writing examples will be distributed.

**Course Objectives:**
The objective of Engr 100W is to combine two distinct areas of study: technical writing and environmental impacts. As a result students will be better prepared for their professional careers to integrate and apply complex skills. The goal of this course is to understand the effects of
environmental factors, both natural and induced, as they relate to products, systems, and processes—while integrating technical communication skills.

The communication aspects of this course provide regular writing assignments, practice in editing, and company-focused oral presentations. Engineers in industry must document findings, share results, build support, and acquire funding. This course will build technical writing that is direct, convincing, and accurate. As a result, students will be able to write and speak not only more effectively, but also more easily and confidently, allowing them to critically evaluate their work.

The content will focus on our earth and environment. What is the difference between science and pseudoscience? How is the practice of engineering grounded in and conditioned by our earth and environment? How do the products of engineering impact our earth and environment? How do engineers affect life forms other than humans? What are engineers doing to improve our environment? What careers are available in these fields? The perspectives of professionalism and ethics are also important.

**Sample Course Topics:**

**Writing Topics Include:**
- Communication in the Global Arena
- Business Emails
- Technical Description
- Compare and Contrast
- Memos
- Good/Bad News Letters
- Lab Report
- Technical Proposal
- Executive Summary
- Progress Report
- Incident Report

**Feasibility Report**
- Trip/Conference Report
- Activity Report
- Task Report
- Process Explanation
- Request for ...
- Technical Instructions
- Interviewing Techniques
- Oral Presentations
- Communicating in Teams
- Developing Visual Aids
- Promotional Pieces
- PowerPoint Skills

**Environmental Topics Include:**
- Energy and Renewable Energies
- Sustainability
- Green Buildings (LEED Certification)
- Environmental Impact Reports
- Water Issues
- Food Production and Distribution
- Soil Conservation and Agricultural Issues
- Marine Protection
- Hazardous Chemicals
- Landfill Dumping Sites
- Pollution
- Storm Water Control
- Underground Storage Tanks
- Ecology
- Pesticides
- Fuel Cells
- Waste Minimization
- Manufacturing Processes
- Occupational Health & Safety
- Public Policy
- E-waste
- Recycling
- Natural Disasters (earthquakes, tsunamis)
- Social Responsibility/Ethics
CHE/ME 109 – Heat Transfer in Electronics

Credits: 3 Units, 75 minute lectures twice a week

Instructor: Professor Melanie McNeil


Catalog Description:
Introduction to thermodynamics and heat transfer, including condition, convection and radiation. An emphasis on applications for electronics; including heat transfer in computer components, heat sinks, liquid and air cooling and heat pipes

Prerequisites: PHYS 71, MATH 133A and EE 98

Required course for CompE majors (either MatE 153 or CHE/ME 109)
Required course for EE majors (either CHE 190 or CHE/ME 109)

Course Learning Outcomes

· Recognize the importance of heat transfer in the design of circuit boards and electronic devices.
· Recognize the dimensions of a heat transfer problem.
· Identify and apply an appropriate coordinate system to describe a heat transfer problem.
· Determine the basic assumptions for a heat transfer problem.
· Identify boundary conditions for the solution of conduction problems.
· Solve one-dimensional conduction problems.
· Determine thermal resistances in multi-layer walls (planes), cylinders and spheres, including convection or radiation resistances in the medium surrounding the hot surfaces.
· Calculate the efficiency and effectiveness of fins on a heat sink, as well as the overall effectiveness.
· Analyze transient heat transfer problems using the one-term approximation or lumped-system analysis, when appropriate.
· Analyze convection problems and calculate the convective heat transfer coefficient.
· Use excel to determine the heat transfer coefficient for trial and error problems when the temperature of the surface subject to convection is not known.
· Restate the principles of radiation heat transfer as they apply to heat transfer in electronics.
· Analyze radiation heat transfer problems and calculate the components of the heat flux.
· Determine which modes of heat transfer apply in a given problem and analyze the relative amounts of heat transfer by the relevant modes.

Student Outcomes Addressed

1. Ability to apply knowledge of mathematics, science and engineering (a)
3. Ability to design system, component or process to meet desired needs (c)
5. Ability to identify, formulate and solve engineering problems (e)
11. Ability to use the techniques, skills and modern tools necessary for engineering practice (k)
Topics Covered

- Introduction to Fundamental Concepts of Heat Transfer
- Heat Transfer Thermodynamics
- Heat Transfer Mechanisms
- Heat Transfer Mathematics
- Formulation of General Heat Conduction Equation
- Example Solutions for Specific Heat Transfer Models
- General Steady-State Conduction Models
- Specific Steady-State Model Solutions
- General Transient Conduction Models
- Specific Transient Model Solutions
- One Dimensional Numerical Methods for Solutions
- Multi-Dimensional Numerical Methods for Solutions
- Convection Fundamentals
- Convection Equations
- External Convection Fundamentals
- Specific Models for External Convection
- Internal Forced Convection
- Convection in Tubes
- Fundamentals of Natural Convection
- Specific Natural Convection Models
- Download Chap 15 from Cengel Website
- Download Chap 15 from Cengel Website
- Fundamentals of Radiation Heat Transfer
- Models for Radiation
- Factors in Radiation Heat Transfer Models
- Surface Effects in Radiation Heat Transfer
- Design Considerations for Radiation
MatE 153

Title: Electronic, Optical, and Magnetic Properties of Solids

Course Catalog Description:
Crystalline and energy band structure of materials, thermal properties and electrical conduction in semiconductors and metals, optical and magnetic properties of solids

Prerequisites: Chem 1A, Math 133A, Physics 51/71 (Elec. & Magn.), EE98

Class/laboratory schedule:

<table>
<thead>
<tr>
<th># of meetings/week</th>
<th>Type of meeting (lecture/lab)</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Lecture</td>
<td>50 min</td>
</tr>
<tr>
<td>1</td>
<td>Lab</td>
<td>165 min</td>
</tr>
</tbody>
</table>

Textbook:
The lab manual is online at http://engr.sjsu.edu/cme/Student_Resources.html

Course Learning Objectives:
The objective of Materials Engineering 153 is to provide an environment for engineering students to learn about some of the properties of materials that contribute to their usefulness in modern electronic, optical and magnetic devices. Calculate equilibrium bond distance and bond energy from potential energy function.
- Identify important low-index planes and directions in cubic crystals.
- Identify families of planes and directions.
- Label planes and directions in a cubic system using Miller’s indices.
- Construct and sketch unit cells of simple, face-centered, body-centered and diamond cubic crystals.
- Utilize Bragg’s law to relate the lattice parameter of a crystal to its wave scattering behavior.
- Distinguish between defects of different dimensionality.
- Calculate the energy of a photon from its wavelength or wave number and vice versa.
- Describe the photoelectric effect.
- Write the one-dimensional time-independent Schroedinger wave equation (SWE).
- Calculate the transition energies between various states.
- Calculate the electron transitions in absorption and emission of energy for a H atom.
- Utilize Hund's rules for distributing electrons in atomic orbitals with correct spin.
- Calculate free electron concentration for a metal from its atomic structure and density.
- Derive density of states function.
- Distinguish between band diagrams for a metal, semiconductor or insulator.
- Calculate the intrinsic carrier concentration in a semiconductor.
- Determine doping type using a Hall voltage measurement.
- Define generation and recombination time for electrons and holes.
- Explain how a pn junction diode works.
- Calculate the ideal saturation magnetization of a solid.
- Explain the Meissner effect.
- Utilize Excel spreadsheets for manipulating data and for plotting and fitting curves.
- Write an effective report documenting laboratory activities and demonstrating analysis of
· Deliver an effective oral report documenting project planning and results.
· Demonstrate ability to function in a small group by performing various job functions.
· Express answers to problems using proper number of significant figures.

Topics Covered (Lecture)
· The Nature of Solids
· Classical Theory of Electrons
· Metal Resistivity
· Particles & Waves
· Electron in a Box
· Hydrogen Atom
· Periodic Table
· Energy Bands & Density of States
· Fermi-Dirac Statistics & Fermi Energy
· Intrinsic Semiconductors
· Extrinsic Semiconductors
· Temperature Dep. Of Semiconductors
· Drift & Diffusion of Carriers
· Intro to Magnetism
· Ferromagnetism & Domains
· Magnetic Devices

Topics Covered (Lab)
· Atomic Bonding, Elements & Alloys
· Linear Regression of Data
· Temp. Dependence of Metal Resistivity (WLR1)
· Crystallography and Defects Part 1
· Hall Effect (WLR2)
· Crystallography and Defects Part 2
· Bandgap Measurement by Optical Absorption (WLR3)
· Minority Carrier Lifetime (OR1)
· Minority Carrier Lifetime (OR1)
· Microelectronics Fabrication
· Temp. Dep. of Semicon. (WLR4)
· Optoelectronic Devices (OR2) Part 1
· Optoelectronic Devices (OR2) Part 2

Relationship of course to Student Outcomes
1. Ability to apply knowledge of mathematics, science and engineering
2. Ability to design/conduct experiments and analyze/interpret data
7. Ability to communicate effectively
9. Recognition of the need for and an ability to engage in life-long learning
10. Knowledge of emerging and new technologies and contemporary social issues
11. Ability to use the techniques, skills and modern tools necessary for engineering practice

Prepared by: Vashti Hayes and Greg Young       Date: June 2010
COOPERATIVE EDUCATION PROJECT
ENGR 197; CHE 197; CMPE 197; EE 197; ISE 197; MATE 197; ME 197; AVIA 197; TECH 197
Spring 2010

Instructor: Ali M. Zargar, Ph.D.
Tel.: 408/924-3194, e-mail: ali.zargar@sjsu.edu
Office Hours: Tuesday 1:30 – 5:30, Wednesday 4:30 – 5:30, and by appointment, IS 104

PREREQUISITES:

Current placement in a meaningful Co-op assignment, including a component that can be used as an approved class project achievable within the duration of the course, is required. Entry into the course will be decided by the instructor in consultation with designated faculty in the appropriate academic discipline within the College of Engineering. Students must complete Co-op Contract, to be signed by Supervisor/Mentor and by the course Coordinator/Instructor.

CONDITIONS OF CO-OP EMPLOYMENT:

Work Attendance -- The Co-op student is expected to be on the job regularly and punctually through the duration of the course.

Absence -- In case of sickness or emergency necessitating a student's absence from work for more than one week, the course instructor should be notified.

Layoff -- A Co-op student who is permanently or temporarily laid off must notify the course instructor immediately.

Termination or Resignation -- A student who leaves his/her Co-op job without the instructor's prior approval, or who is terminated due to poor performance may receive a failing grade in the course.

Work Performance -- A Co-op student who, even though not discharged by the employer, fails to perform satisfactorily may receive a failing grade in the course.

COURSE DESCRIPTION:
A 3-unit undergraduate approved technical elective designed to assist the student in making the transition from the classroom to industry. The learning environment is less structured, and the academic content of the course is geared to the individual interests and abilities of the class. Students will participate in a paid, course-related, supervised Co-op work experience involving 20 or 40 hours per week on-the-job. This work experience affords a degree of independence and an element of learning not usually possible in the conventional classroom.

Students must participate in biweekly activities starting at about the third week in the semester. The primary objective of these activities is to provide a focus for the work experience by assisting the student in assessing the growth and learning which are being realized.
COURSE OBJECTIVES:
The main objective of this course is to improve the technical competency of the student using his/her project as a vehicle. While doing so, the course could help the student explore and learn about issues such as:
  · The variety of work patterns and settings in the work environment.
  · Personal/professional interrelationships in the work environment.
  · Politics, conflict, competition in the work environment.
  · Career options available in the student's academic area.

A secondary objective is to have the student define specific learning objective(s) to be accomplished in the areas of professional development and personal growth.

ASSIGNMENTS:
The following major course assignments address the previously stated objectives:
1. Three short oral presentations on the approved project.
2. Providing the course instructor with a guided tour of the student's work environment, including a brief on his/her project and its progress, and a meeting with the student's supervisor or mentor.
3. An oral report on the professional development learning objective(s), the corresponding activities to meet this goal, and the outcome of these activities.
4. A written semi-formal report describing the project and its outcome following its completion, a corresponding final oral presentation, and a poster describing your project to be displayed at the final two classes.
5. Attendance of your industry mentor/ supervisor or his/her representative to the Final Presentation, last day of class if at all possible.
6. Written assignments
   · Learning contract
   · Copy of your Presentations
   · Site visit scheduling data (recommended)
   · Final report

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Contract</td>
<td>By Feb. 10</td>
</tr>
<tr>
<td>Presentation I</td>
<td>By March 3</td>
</tr>
<tr>
<td>Progress Report with your Mentor’s Initials</td>
<td>By April 7</td>
</tr>
<tr>
<td>Presentation II</td>
<td>April 14</td>
</tr>
<tr>
<td>Presentation II continued</td>
<td>April 21</td>
</tr>
<tr>
<td>Final Written Report with your Mentor’s Initials</td>
<td>May 5</td>
</tr>
<tr>
<td>(Everyone’s reports is due)</td>
<td></td>
</tr>
<tr>
<td>Final Presentation (Half of the class)</td>
<td>May 5</td>
</tr>
<tr>
<td>Final Presentation (The other half)</td>
<td>May 12</td>
</tr>
</tbody>
</table>
A3. Lower-Division Math and Science Course Syllabi

CHEM 1A – General Chemistry

Credits and Contact Hours Including Lab: Lecture: (3) sessions each week. Each lecture session is 50 minutes. Lab: (1) session each week. Each lab session is 3 hours. Seminar: (1) session each week. Each seminar is 50 minutes.

Instructor: Dr. Resa Kelly


Specific Course Information

a. Course Description: First semester of college level General Chemistry. Course is required of all Science and Engineering majors except Computer Science. Topics including stoichiometry, reactions, atomic structure, periodicity, bonding, states of matter, energy changes, solutions using organic and inorganic examples. Lab programs complements lecture.

b. Prerequisites: Proficiency in high school chemistry or Chem 10 (with a grade of "C" or better; "C-" not accepted) or instructor consent; proficiency in high school algebra and eligibility for Math 19; eligibility for Engl 1A.

c. Designation: “Required”

Specific Goals for the Course

a. Course Objectives - The student will be able to:

· Perform calculations and report the correct number of significant figures and units.
· Select the appropriate conversion factors and make use of them in dimensional analysis problems.
· Convert between moles, mass and number of particles, making use of stoichiometric factors.
· Calculate a % composition given a molecular formula and vice versa (empirical formula and molecular formula problems).
· Name salts, acids, bases and covalent compounds. Be able to provide the formula of these compounds given their chemical name.
· Provide the net ionic representation of any salt, base or acid by using the solubility and dissociation rules.
· Demonstrate the difference between solubility and dissociation.
· Identify weak and strong acids and bases by formula and name.
· Construct molecular, total and net ionic equations for double displacement reactions, and identify the physical state of species.
· Recognize an oxidation, a reduction, an oxidation agent, a reducing agent and a redox reaction.
· Calculate an oxidation number of the elements in a formula.
· Balance a reduction oxidation reaction under acidic and basic conditions.
· Perform stoichiometric calculations for chemical and non-chemical systems whether they have a known or unknown limiting reactant.
· Calculate the molarity of a solution given the necessary data whether you are starting with a mass of solute or with a concentrated solution.
· Name elements, provide their symbols and be able to determine number of electrons, protons and neutrons for any chemical species.
· Use de Broglie’s equation and have a simple understanding of what it means.
· Calculate and convert between wavelength, frequency and energy.
· Have some general understanding of what color is and why things exhibit color.
· Calculate the energy associated with a given electronic transition in a hydrogen atom.
· Demonstrate what each quantum number represents and how to obtain the quantum numbers for any electron in an atom.
· Write the full and abbreviated electronic configuration of an element, the quantum numbers for any electron in an atom and a representative diagram of orbitals with correct electron filling.
Predict whether an atom is paramagnetic or diamagnetic. Provide the number of unpaired electrons and predict the expected oxidation states. Identify an element given the four quantum numbers of the last electron or the nl^2 notation of the element.

Explain what is meant by electronegativity, electron affinity and ionization potential.

Organize a set of elements in order of increasing atomic radius, ionic radius, first ionization energy and electronegativity.

Use the element’s position in the periodic table to determine its: metal/nonmetal properties; acid/base properties; insulator/conductor/semiconductor properties. Understand the role electronic configuration plays in band gap theory and how manipulating elemental composition alters the energy gap.

Determine whether a bond is metallic, ionic, covalent or polar covalent.

Represent ionic bonding using Lewis dots.

Provide Lewis dot diagrams, the molecular geometry, hybridization and polarity of a covalent molecule.

Determine the bonding types in a molecule as well as the types of orbital used to make the particular bond.

Explain and understand the concept of pressure. How to convert from height readings in one liquid to mercury heights and vice versa. Convert temperatures in C to K.

Successfully solve for a variable using the ideal gas law equation, PV = nRT, and derive relationships between variables in that equation such as P_1V_1 = P_2V_2 as well as relationships with density and molecular weight.

Understand and perform calculations using Dalton’s Law of Partial Pressures.

Understand the fundamentals of the Kinetic Molecular Theory of Gases including root mean square velocity and Graham’s Law of Effusion and Diffusion.

Explain the gas laws at the molecular level including the role of temperature, collision rate, force of collisions, number of particles plays on determining the pressure of a gas.

Identify and explain the nature of each of the intermolecular forces and apply how the intermolecular forces affect physical properties.

Organize a set of molecules/atoms in order of increasing intermolecular force.

Define basic properties of viscosity, surface tension, capillary action, boiling and vapor pressure and understand how intermolecular forces affect these physical properties.

Recognize examples of materials that manipulate intermolecular forces in the real world. (adhesives, coatings, nanotechnology, DNA, etc.).

Explain specific heat and perform calculations using the heat equation for temperature changes.

Perform calculations of heat transfer with and without phase changes and with both combined.

Use Hess’ Law to obtain the heat of reaction and use heats of formation to obtain heats of reaction.

Identify what are exothermic and endothermic reactions and how chemicals can store energy.

Recall nomenclature for alkanes, alkenes and alkynes, and recognize a few of the organic functional groups and their importance.

b. Relationship of Course to Program Outcomes: This lower-division basic science course contributes to Program Educational Objectives and Outcomes as follows:

(a) Proficiency in the ability to apply knowledge of mathematics, science and engineering through problem solving and oral presentations.

(b) Proficiency in the ability to design and conduct experiments, as well as to analyze and interpret data.

Topics Covered: Moles/empirical/molecular, naming/solubility/net ionic equation, stoichiometry, reduction oxidation reactions, molarity, atomic structure, electronic configuration, periodic properties, bonding, forces, gases, heat transfer, heats of reaction, organic. Examples of applications of chemistry to biology, medicine and engineering fields.

Prepared by: Dr. Resa M. Kelly          Date: Spring 2011
San Jose State University  
MATH 30: Calculus - Spring 2011

Course: Math 30, Class number: 23856 Section: 1  
3:00-4:15 pm MW, MH323

Instructor: Misako van der Poel  
Office: MacQuarrie Hall 439

Office Phone: 408-924-7487  
Email: misako.vanderpoel@sjsu.edu

Webpage: http://www.sjsu.edu/people/misako.vanderpoel/

Office Hours: M & W: 11:20 - 11:50am, 1:20 – 2:50pm, or by appointment


Catalog Description: Introduction to Calculus including limits, continuity, differentiation, applications and introduction to integration. Graphical, algebraic and numerical methods of solving problems.

Prerequisites: Satisfactory score on the Mathematics Placement Exam; satisfaction of the ELM requirement.


Course Objectives: To learn the concepts and techniques of differential calculus and use them in solving applied problems. To study limits, continuity, differentiation and applications of the derivative.

Grading Policy:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>9%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>16% (Quiz1,2, 3, &amp; 4 4.4% each)</td>
</tr>
<tr>
<td>Midterms</td>
<td>45% (Exam1, 2, and 3 15% each)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

Remarks: There are no make-up exams or quizzes given allowed unless you have a valid reason and you make arrangements with me ahead of time.

Homework: It is very important for you to do all of your assignments in a timely manner. Two lowest scores will be dropped. **I do not accept any late homework.** (Please see The Homework Policy & Guidelines.)

Quiz: Four quizzes will be given.

Skill Check: A skill check (short quiz) will be given occasionally in class.
Calculators: You are allowed to use a graphing calculator on quizzes and exams. However you are not allowed to use the TI-89, the TI-92, or other calculators that can do symbolic algebra, on exams. (Other TI calculators are fine.)

Cell Phones: Students will turn their cell phones off or put them on vibrate mode while in class. They will not answer their phones in class. No cell phone may remain on a student’s desk. Students whose phones disrupt the course and do not stop when requested by the instructor will be referred to the Judicial Affairs Officer of the University. In addition, laptop computers, pagers, headphones, and earphones will not be allowed during class.

Grading Scale: The following scale is tentative. will be given only to outstanding students.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>63 – 67 %</th>
<th>C-</th>
</tr>
</thead>
<tbody>
<tr>
<td>92 % or higher</td>
<td>A</td>
<td>63 – 67 %</td>
<td>C-</td>
</tr>
<tr>
<td>88 – 91 %</td>
<td>A-</td>
<td>58 – 62 %</td>
<td>D+</td>
</tr>
<tr>
<td>84 – 87 %</td>
<td>B+</td>
<td>55 – 57 %</td>
<td>D</td>
</tr>
<tr>
<td>80 – 83 %</td>
<td>B</td>
<td>53 – 54 %</td>
<td>D-</td>
</tr>
<tr>
<td>77 – 79 %</td>
<td>B-</td>
<td>Below 53 %</td>
<td>F</td>
</tr>
<tr>
<td>74 – 76 %</td>
<td>C+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>68 – 73 %</td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DEPARTMENT OF MATHEMATICS, SJSU

MATH 31 (Sec. 02) (Calculus II)  Spring 2011  MTWTh 9:00 – 9:50  MH 224

Catalog description: Definite and indefinite integration with applications. Sequences and series. Graphical, algebraic and numerical methods of solving problems. 4 units.

Prerequisite: Math 30 or 30p (with a grade of C- or better)

Instructor: Tatiana Shubin

Office: MH 314

I can be reached either by phone at 408-924-5146 or by e-mail at shubin@math.sjsu.edu

Office Hours: MTWTh 1:30-2:35 pm

or by arrangement


Course Objectives: To learn the concepts and techniques of integral calculus and to use them in solving applied problems. To learn the concept of infinite sequences and series. To investigate convergence properties of numerical and power series and their application to representation of functions as power series.

Homework, Quizzes, Tests: Homework will be assigned at each class meeting and will be due at the next meeting. Every Thursday when class is meeting (except for January 27 and those weeks when a midterm is scheduled), there will be either a closed-book quiz with problems taken from specified assignments, or your homework will be collected and graded. (The specific mode of grading will be discussed in class.) There will also be three midterms (on February 24, March 24, and April 28), and a comprehensive final exam (Friday, May 20, 7:15 – 9:30). All exams will be closed-book, no notes allowed, but calculators (except for those capable of algebraic manipulations) are fine. Make-up tests will be given only in the event of an unavoidable hospitalization or similar emergency.

Grading: Your course grade will be given according to your total score accumulated as follows:

11 Quizzes 165 points (15 x 11)
3 Midterms 180 points (60 x 3)
Participation*  60 points
Final Exam 115 points
Total 520 points

Scale: A/ A- minimum score: 475/ 450 points respectively
B+/ B/ B-  435/ 415/ 400
C+/ C/ C-  385/ 365/ 350
D  300

Miscellaneous: 1. General information and guidelines regarding academic integrity and university policies can be found at http://www.sjsu.edu/math/courses/greensheet

2. If you have any questions, feel free to discuss them in class and/or during my office hours. I'll be glad to provide any help you need, but you have to tell me when you need it.
DEPARTMENT OF MATHEMATICS, SISU

MATH 31 (Sec. 03) (Calculus II)  Spring 2011  MTWTh 10:30 – 11:20  MH 224

Catalog description: Definite and indefinite integration with applications. Sequences and series. Graphical, algebraic, and numerical methods of solving problems.  4 units.

Prerequisite: Math 30 or 30p (with a grade of C- or better)

Instructor: Tatiana Shubin

Office: MH 314

I can be reached either by phone at 408-924-5146 or by e-mail at shubin@math.sisu.edu

Office Hours: MTWTh 1:30-2:35 pm

or by arrangement


Course Objectives: To learn the concepts and techniques of integral calculus and to use them in solving applied problems. To learn the concept of infinite sequences and series. To investigate convergence properties of numerical and power series and their application to representation of functions as power series.

Homework, Quizzes, Tests: Homework will be assigned at each class meeting and will be due at the next meeting. Every Thursday when class is meeting (except for January 27 and those weeks when a midterm is scheduled), there will be either a closed-book quiz with problems taken from specified assignments, or your homework will be collected and graded. (The specific mode of grading will be discussed in class.) There will also be three midterms (on February 24, March 24, and April 28), and a comprehensive final exam (Thursday, May 19, 9:45-12:00). All exams will be closed-book, no notes allowed, but calculators (except for those capable of algebraic manipulations) are fine. Make-up tests will be given only in the event of an unavoidable hospitalization or similar emergency.

Grading: Your course grade will be given according to your total score accumulated as follows.

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Quizzes</td>
<td>165 (15x11)</td>
</tr>
<tr>
<td>3 Midterms</td>
<td>180 (60 x 3)</td>
</tr>
<tr>
<td>Participation</td>
<td>60</td>
</tr>
<tr>
<td>Final Exam</td>
<td>115</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>520</td>
</tr>
</tbody>
</table>

Scale: A/A- minimum score: 475/450 points respectively

B+/B/B-                  | 435/415/400  |
C+/C/C-                  | 385/365/350  |
D                        | 300

Miscellaneous: 1. General information and guidelines regarding academic integrity and university policies can be found at [http://www.sisu.edu/math/courses/greensheet](http://www.sisu.edu/math/courses/greensheet)

2. If you have any questions, feel free to discuss them in class and/or during my office hours. I'll be glad to provide any help you need, but you have to tell me when you need it.
Math 32 – Calculus III

This course includes polar coordinates, parametric equations, vector calculus, functions of several variables, and multiple integrals.

Course Schedule: 2 lecture periods, 75 minutes each per week.
Semester: Spring 2011
Prerequisites: Math 31 (Calculus II) with a grade of C- or better.


Course Goals:
To understand concepts in 3 – dimensions and its geometry
To apply these concepts to solve applied problems

Student Learning Objectives:
Upon Completion of the course the students will be able to do the following:
1. Use polar coordinates effectively in applications.
2. Use parametrizations of lines and curves.
3. Compute velocities and curvature.
4. Graph three dimensional surfaces.
5. Differentiate functions of several variables
6. Find tangent lines and tangent planes.
7. Use the chain rule to transform partial differential equations.
8. Find the extreme values for functions of two variables.
9. Evaluate areas, volumes, center of mass using double integrals.
10. Use triple integrals and spherical coordinates to compute volumes and center of mass of a solid.

Outcome Assessment: Two or three exams and a comprehensive final should be given. Numerous homework problems are assigned and quizzes will be given.

Course Topics

<table>
<thead>
<tr>
<th>Topics</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parametric Equations and polar coordinates</td>
<td>1.5</td>
</tr>
<tr>
<td>Vectors and applications</td>
<td>3</td>
</tr>
<tr>
<td>Vector Functions and Space Curves</td>
<td>1.5</td>
</tr>
<tr>
<td>Functions of Several Variables</td>
<td>4</td>
</tr>
<tr>
<td>Multiple Integrals</td>
<td>3.5</td>
</tr>
<tr>
<td>Exams and Quizzes</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Prepared by Samih Obaid – Mathematics Department DATE: Spring 2011
Math 133A – Ordinary Differential Equations

This course is intended to provide an introduction to ordinary differential equations. It covers first order equations, such as separable and linear ones, first order systems, and second order homogeneous and non-homogenous equations, and the Laplace transform.

Course Schedule: 2 lecture periods, 75 minutes each, per week
Semester: Spring 2011
Prerequisites: Math 32 (with a grade of "C--" or better) or instructor consent.

Course Goals:
• To thoroughly master the most important methods and techniques for solving ordinary differential equations (ODE).
• To learn about modeling and applications of ODEs to the sciences and engineering.

Student Learning Objectives:
Upon completion of the course, students will be able to do the following:
• Demonstrate understanding of the basic ideas of ODEs: the notion of the solution, phase portrait and qualitative behavior.
• Analyze and solve a variety of applications including problems involving the harmonic oscillator, predator-prey systems, and RC circuits.
• Solve a system of two linear first order ODEs.
• Solve second order constant coefficient homogeneous ODEs.
• Solve second order constant coefficient forced ODEs using the Laplace transform or the method of the "lucky guess".
• Give practical interpretations of the solutions of ODEs coming from applications.
• To use the computer to solve ODEs numerically.

Contributing to Student Outcomes: Proficiency in and ability to apply knowledge of mathematics.

Course Topics:

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Topic(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>First order equations</td>
</tr>
<tr>
<td>3-5</td>
<td>Geometry of systems</td>
</tr>
<tr>
<td>6-8</td>
<td>Linear systems</td>
</tr>
<tr>
<td>9-10</td>
<td>Forced harmonic oscillators</td>
</tr>
<tr>
<td>11-12</td>
<td>Analysis of nonlinear systems</td>
</tr>
<tr>
<td>13-15</td>
<td>The Laplace transform</td>
</tr>
</tbody>
</table>

Prepared by: Slobodan Simić    Date: Spring 2011
Physics 50 - General Physics: Mechanics

Instructor and course coordinator: Dr. Monika Kress (lab coordinator: Dr. Peter Beyersdorf)

Course Description:
First semester of university-level calculus-based Physics. This course is required of all Science and Engineering majors except Biological Sciences. Topics include the motion of particles (kinematics and dynamics), gravity, work and energy, linear momentum, rotational motion, equilibrium and gravitation. Lab program complements lecture.

Course information:
Pre-requisite: A grade of C- or better in Math 30 or 30-P (Calculus I).
Co-requisite: Physics 50W (Workshop) 2 hours per week, 1 unit, credit/no credit
Credits: 4 units: 150 minutes of lecture instruction per week, 3 hours of lab per week.
Additional information: There are 6 lecture sections, each limited to an enrollment of 50. Two sections are taught by tenured faculty and 4 by part-time faculty. The labs are mostly taught by graduate TA’s and part-time faculty. The Physics 50W workshop is designed to give students additional problem-solving practice that cannot be covered in lecture. The workshops are facilitated by undergraduate science and engineering majors who have earned a grade of A- or better in this course at SJSU. A small number of students (about 5) have been allowed to opt out because they already had substantial proficiency in the subject material.


Course Objectives:
1. Be able to assign the proper units and significant digits to the solutions of physics problems
2. Understand the relationship between forces and the objects that respond to those forces
3. Apply Newton’s Laws and Conservation Laws (energy, momentum and angular momentum) to the world around you
4. Use Newton’s Laws and Conservation Laws to predict the behavior of simple mechanical systems
5. Solve relatively complex physical problems in a systematic manner (i.e. not just plug-and-chug)

Contribution of Course to Meeting the Professional Component: Four semester units of basic science with experimental evidence.

Relationship of Course to Program Outcomes:
This lower-division basic science course contributes to Program Educational Objectives and Outcomes as follows:
(a) Proficiency in the ability to apply knowledge of mathematics, science and engineering through problem solving.
(b) Proficiency in the ability to design and conduct experiments, as well as to analyze and interpret data.
Topics covered:

1. Vectors and vector mathematics (vector addition and subtraction, vector product, scalar product)
2. Equations of motion: Displacement and velocity, with constant and time-varying acceleration.
3. Motion in a circle, projectile motion
4. Newton’s laws
5. Work, force, kinetic energy, potential energy
6. Conservation of momentum
7. Conservation of energy
8. Equations of rotational motion: angular displacement, angular velocity, with constant or time-varying angular acceleration
9. Conservation of angular momentum
10. Torque and equilibrium
11. Newton’s Laws of Gravitation
12. Sound, waves, and simple harmonic motion: Few instructors cover these topics because there is insufficient time, particularly given how unprepared most of our students are for this course.

Prepared by: Dr. Monika Kress, 1 May 2011.
ABET GREEN SHEET   PHYSICS 51   ELECTRICITY AND MAGNETISM

1. Physics 51 Electricity and Magnetism

2. 4.0 units, 2 lecture periods 75 minutes each, 1 lab period 3 hours each week

3. Dr. Joseph F. Becker

4. *University Physics*, 12th Ed., Vol. 2 by Young & Freedman, (Addison-Wesley) and an online HW access code.

5. Specific course information
   a. This course covers the fundamental principles of basic dc and ac circuits, electric and magnetic fields, and electromagnetic waves.
   b. prerequisites or co-requisites
      Physics 50 or 70, and Math 31
   c. required course

6. Specific goals for the course
   a. Specific outcomes of instruction.
      • An ability to apply knowledge of mathematics and science.
      • An ability to conduct experiments: set up apparatus, debug, acquire, analyze and interpret data, write lab report
   b. Student outcomes
      • explain the relationship between electric fields and electric charges
      • determine the electric field caused by a continuous distribution of electric charge.
      • demonstrate the use Gauss’s Law to calculate electric fields.
      • calculate the electric potential energy of a collection of charges.
      • analyze and solve for the energy and power in circuits.
      • find the resistance of a conductor from its dimensions and its resistivity.
      • describe how an electromotive force makes it possible for current to flow.
      • apply the use of Kirchhoff’s Rules in analyzing complicated.
      • analyze the motion of a charged particle in a magnetic field
      • apply Ampere’s Law to calculate the magnetic field caused by current
      • explain how a changing magnetic flux generates an electric field
      • evaluate the amount of power flowing into or out of an AC circuit
      • give interpretation of propagating and standing electromagnetic waves.
7. Brief list of topics to be covered

- Electric Charge and Electric Field: Basic Concepts and Coulomb's Law
- Gauss's Law: Used to calculate the value of the electric field
- Electric Potential: Related to potential energy of a charge
- Capacitance and Dielectrics: Energy stored in the electric field of a capacitor
- Current, Resistance, and Electromotive Force: The flow of electric charge
- Direct Current Circuits: Direct, or constant, current flow and RC circuits
- Magnetic Field and Magnetic Forces: Magnetic force on a moving electric charge
- Sources of Magnetic Field: Ampere's Law and Law of Biot-Savart's Law
- Electromagnetic Induction: Faraday's Law
- Inductance: Energy stored in the magnetic field of an inductor or coil
- Alternating Current: Analysis of RLC circuit using phasors
- Electromagnetic Waves: Maxwell's equations of electromagnetic theory

Physics 52 (General Physics / Heat & Light)

Course Schedule: 2 lecture periods, 75 minutes each, plus Lab, 2 hours and 50 minutes per week. (4 Units credit)

Course Instructor: Todd Sauke, Office: Science #324. Phone 924-5437. Email: todd.sauke@sjsu.edu

Semester: Spring 2011


Course Information: Temperature, heat, thermodynamics, kinetic theory, geometric and physical optics. Students will study and learn about the following topics: The wave nature of light, reflection refraction and polarization of light, optical instruments and geometric optics, interference and diffraction of light waves. Temperature and heat, thermal properties of matter, the First and Second Laws of thermodynamics.

Prerequisites: PHYS 50 or PHYS 70, and Math 30 or 30P with grades of "C-" or better.

Course Goals: To understand and apply basic optical and thermodynamic concepts and to use the concepts in solving applied problems.

Student Learning Objectives:
(a) An ability to apply knowledge of mathematics and science.
(b) An ability to conduct experiments, as well as to analyze and interpret data.

Week Lecture Topic(s)
Lecture topics and Homework (due before midnight on due date)

<table>
<thead>
<tr>
<th>Tuesday</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-27 Intro / Review of Ch. 32 from PHYS 51</td>
<td>2-3 Ch. 33</td>
</tr>
<tr>
<td>2-1 Ch. 33 / HW Intro due</td>
<td>2-3 Ch. 33</td>
</tr>
<tr>
<td>2-8 Ch. 34 / HW 33 due</td>
<td>2-10 Ch. 34</td>
</tr>
<tr>
<td>2-15 Ch. 34</td>
<td>2-17 Ch. 34</td>
</tr>
<tr>
<td>2-22 Ch. 35 / HW 34 due</td>
<td>2-24 Ch. 35</td>
</tr>
<tr>
<td>3-1 Catch up/Practice MT/HW 35 due</td>
<td>3-3 Midterm Exam #1</td>
</tr>
<tr>
<td>Date</td>
<td>Activity</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>3-8</td>
<td>Review Midterm / Start Ch. 36</td>
</tr>
<tr>
<td>3-15</td>
<td>Ch. 36</td>
</tr>
<tr>
<td>3-22</td>
<td>Ch. 17 / HW 36 due</td>
</tr>
<tr>
<td>3-29</td>
<td><strong>Spring Break</strong></td>
</tr>
<tr>
<td>4-5</td>
<td>Ch. 17 / HW 17 due <strong>due April 6</strong></td>
</tr>
<tr>
<td>4-12</td>
<td>Review Midterm / Start Ch. 18</td>
</tr>
<tr>
<td>4-19</td>
<td>Ch. 18</td>
</tr>
<tr>
<td>4-26</td>
<td>Ch. 19 / HW 18 due</td>
</tr>
<tr>
<td>5-3</td>
<td>Ch. 19</td>
</tr>
<tr>
<td>5-10</td>
<td>Ch. 20</td>
</tr>
<tr>
<td>5-17</td>
<td>Ch. 20 Wrap up / HW 20 due</td>
</tr>
</tbody>
</table>

**Prepared by: Todd Sauke**

**Date: Spring 2011**
PHYS 053: General Physics/Atomic Physics

Description: Introduction to quantum physics emphasizing electronic structure of atoms and solids, radiation and relativity.

Prerequisite: PHYS 70 and PHYS 71; or PHYS 50, PHYS 51 and PHYS 52; CHEM 1A, (with grades of "C-" or better).

Number of Units: 2

Topics

Relativity
- Invariance of Physical Laws
- Relativity of Time Interval
- Relativity of Length
- The Lorentz Transformation
- Relativistic Momentum and Energy

Photons, Electrons, and Atoms
- The Photoelectric Effect
- Atomic Spectra and Energy Levels
- The Bohr Model of Atom
- The Laser
- X-Ray Production and Scattering
- Compton Scattering
- Black-Body Radiation and Wave-Particle Duality

Wave Nature of Particles, Quantum Mechanics
- Electron Diffraction
- Schroedinger Equation, Wave Functions, and Uncertainty Principle
- Particle in a box
- Potential Wells, Potential Barriers, and Tunneling
- Harmonic Oscillator

Atomic Structure
- Hydrogen Atom and associated wave functions
- Zeeman Effect and Electron Spin
- Many-Electron Atoms and Periodic Table

Molecules and Condensed Matter
- Molecular Spectra
- Structure of Solids
- Energy Bands and Free electron Model of Metals
- Semiconductors

Nuclear Physics
- Properties of Nuclei
- Binding Energy and Nuclear Structure
- Nuclear Stability and Radioactivity
- Nuclear Reactions, Nuclear Fission, Nuclear Fusion and Nuclear Power
- Biological effects of Radiation
Appendix B: Faculty Vitae

Appendix B1: Vitae of Full-time Tenure/Tenure-Track Faculty
Appendix B2: Vitae of Part-time (Lecturer) Faculty
B1. Vitae of Full-time Tenure/Tenure-Track Faculty

San José State University
Electrical Engineering Department
CURRICULUM VITAE

<table>
<thead>
<tr>
<th>NAME</th>
<th>ACADEMIC RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shahab Ardalan</td>
<td>Assistant Professor</td>
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</tbody>
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<table>
<thead>
<tr>
<th>DATE OF ORIGINAL APPOINTMENT</th>
<th>YEARS OF SERVICE (as of Spring 2011)</th>
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<tbody>
<tr>
<td>January 2011</td>
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<table>
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<tr>
<th>YEAR OF ADVANCEMENT IN RANK</th>
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<tbody>
<tr>
<td>Rank</td>
<td>Year</td>
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<tr>
<td>Assistant Professor</td>
<td>2011 San José State University, Electrical Engineering Department</td>
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<table>
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<th>TIME COMMITMENTS</th>
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<tbody>
<tr>
<td>Percentage of time committed to the program</td>
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<tr>
<td>Percentage of time available for research or scholarly activities</td>
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<table>
<thead>
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<th>TEACHING RESPONSIBILITIES</th>
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<tbody>
<tr>
<td>Two courses: EE227, EE224</td>
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<tbody>
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</tr>
<tr>
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<tr>
<td>MS</td>
</tr>
<tr>
<td>BS</td>
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</table>

<table>
<thead>
<tr>
<th>OTHER RELATED EXPERIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Analog Mixed Signal Designer, R&amp;D, Gennum Corp</td>
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<table>
<thead>
<tr>
<th>CONSULTING AND PATENTS</th>
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</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>S. Ardalan, M. Sachdev, “low input swing voltage D-Flip-Flop” (pending)</td>
</tr>
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<table>
<thead>
<tr>
<th>PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION</th>
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</thead>
<tbody>
<tr>
<td>State</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>HONORS, GRANTS AND AWARDS</td>
</tr>
<tr>
<td>▪ NSERC Post Doctorial Fellowship (PDF), $80000 (DECLINED)</td>
</tr>
<tr>
<td>▪ NSERC Postgraduate Doctorial Scholarship (PGS-D), $63000</td>
</tr>
<tr>
<td>▪ Graduate Incentive Award, $30000, University of Waterloo</td>
</tr>
<tr>
<td>▪ Ontario Graduate Scholarship, $15000 (declined)</td>
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</table>

<table>
<thead>
<tr>
<th>MEMBERSHIP IN PROFESSIONAL SOCIETIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Member of IEEE, Solid State Society and Circuit and System Society</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Adjunct Lecturer, ECE-437: Integrated VLSI Systems, University of Waterloo</td>
</tr>
<tr>
<td>▪ Workshop, Substrate Noise Mitigation in Systems on Chip (4 Hours)</td>
</tr>
<tr>
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<tr>
<td></td>
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</tbody>
</table>
– 5th IEEE International Northeast Workshop on Circuits and Systems, Montreal, Canada 2007
– Tutorial, Substrate Noise Suppression Techniques for Systems on Chip (4 Hours)
– 49th IEEE International Midwest Symposium on Circuits and Systems, Puerto Rico, 2006
– 4th Year Design Project, Mentor and Consultant, “RFID Hands-Off Temperature Sensor”
– University of Waterloo, 2006

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

- Member of IEEE Region-7(Canada) board since 2004-2011
- Past-Chair, IEEE Kitchener/Waterloo Section
- Chair, IEEE Solid-State Circuit Society, Kitchener/Waterloo Section
- Technical Reviewer for JSSCC, ISCAS, MWSCAS, ICUE and potential magazine
- Member of steering committee for IEEE Telecommunication system and circuit conference (ITSCC), Sponsored by Research In Motion (RIM) Corp. (MOU submitted to IEEE for 2011)
- Publicity Chair, IEEE 2010 International Conference On Autonomous and Intelligent Systems (AIS)
- Member of organizing committee for the 24th IEEE Canadian Conference on Electronic and Computer Engineering, 2010
- General Chair and Member of organizing committee for IEEE International Conference for Upcoming Engineers 2009
- Publicity Chair, 2009 IEEE Toronto International Conference Science and Technology for Humanity (TIC-STH 2009)
- Member of technical program committee (Circuits, Devices, and Systems Symposium co-chair) for the 22nd IEEE Canadian Conference on Electronic and Computer Engineering, 2009
- Member of organizing committee for the 21st IEEE Canadian Conference on Electronic and Computer Engineering, 2008
- Student Program Co Chair for IEEE International Conference on System, Man, and Cybernetics, 2007
- General Chair for IEEE International Conference for Upcoming Engineers 2006

SELECTED PUBLICATIONS (last 5 years)

San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Tri Caohuu

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1990

YEARS OF SERVICE (as of Spring 2011)
21 years

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Professor 2001 San José State University, Electrical Engineering Department
Associate Professor 1990 San José State University, Electrical Engineering Department
Adjunct Professor 1989 Texas A&M, Department of Computer Science

TIME COMMITMENTS
Percentage of time committed to the program 100%
Percentage of time available for research or scholarly activities 20%

TEACHING RESPONSIBILITIES
Teaching graduate and undergraduate courses in the area of Digital System Design
Graduate Program Coordinator

EDUCATION
Degree Field Institution Year
Ph. D. Electrical Engineering Texas A&M 1989
MS Electrical Engineering San Diego State University 1972
BS Electrical Engineering San Diego State University 1971

OTHER RELATED EXPERIENCE
Description Year
Guest Professor, Institute of Microelectronic Systems 1999-2000
Darmstadt University of Technology
Darmstadt, Germany

Director of R&D, EMC Ltd.
Toronto, Ontario, Jan. 1982 to Aug. 1986
Responsible for research and development of EMC product line. Responsible for project management and supervision of technical staff. Preparation of technical proposals, seeking funds and serving as liaison with the National Research Council, Canada (NRC) and other clients for consulting and researching contracts.

Senior Research Engineer, Barringer Research Ltd.
Investigated and developed computer systems applying the COTRANTM principle (Correlation of Transient Response) to a number of applications in tramp metal detection (US Steel, Rexnord) and airborne exploration survey.

Member of Scientific Staff, Bell Northern Research
System Integrity group, supporting the development of the digital switching system

CONSULTING AND PATENTS
Description Year
Consultant for HP, Computer Enterprise Division, 2001-02
Consultant for Quantum, Winter 1999
Consultant for IBM, Storage Division, Summer 1998
Consultant for Loral Western Lab, Summer 1994
Consultant for SixGraph Computing Ltd., Summer 1992
Consultant for FUJITSU AMERICA INC., Summer 1991

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

HONORS, GRANTS AND AWARDS
N/A

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
Associate Chair, Electrical Engineering Department, SJSU, 2004-2006

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Founder and Chairman of Saigon Advanced Institute of Technology, HCM City, Vietnam

SELECTED PUBLICATIONS (last 5 years)

Tin-Yam Yau, Tri Caohuu, and JeongHee Kim, “An Efficient All-Digital Phase-Locked Loop with Input Fault Detection”, accepted for publication in Proc. of the Int. Conf. on Information Science and Applications (ICISA 2011), April 26-29, Jenu, Korea.

Tejesh Makanawala and Tri Caohuu, “Robotic FPGA Tool Box”, in the Proc. of the 14th Int. Conf. on Methods and Models in Automation and Robotics (MMAR2010), Aug. 23-26, Miedzyzdroje, Poland.

Nicholas J. Pouliot, Tri Caohuu and Le Hoai Nghia, “Integration of Asynchronous Components into Synthesis Tools”, Int of the Proc. of the Int. Conf. on Information Technology Education (IT-EDU2010), Aug. 18-21, HCM City, Vietnam
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Ray R Chen

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1983

YEARS OF SERVICE (as of Spring 2011)
28

YEAR OF ADVANCEMENT IN RANK

Rank Year Institution and Department
Professor 1986 San José State University, Electrical Engineering Department
Associate Professor 1983 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 10%

TEACHING RESPONSIBILITIES
Teach courses in area of Circuits, e.g., EE 98, EE101

EDUCATION
Degree Field Institution Year
Ph.D. EE Santa Clara University 1982
M.S. EE Santa Clara University 1976
B.S. EECS Santa Clara University 1974

OTHER RELATED EXPERIENCE
Description Year
Professional Leave from SJSU (working in the industry) 2001 - 2004
EE Department Chair, SJSU 1989 - 1998
Assistant Professor, Santa Clara University 1982 – 1983
Instructor, Santa Clara University 1980 – 1982
Research Associate, Tokyo Institute of Technology, Japan 1981
Teaching Fellow, Santa Clara University 1978 – 1980

CONSULTING AND PATENTS
Description Year
Consulting with companies in Silicon Valley including National Semiconductor

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field
None

HONORS, GRANTS AND AWARDS
“Friendship Award”, Peoples Republic of China, 2007
“Dr. Ray Chen Day”, Santa Clara County, California, September 10, 1998
Distinguished Visiting Professor, Chuo University, Tokyo, Japan
Honorary Dean, College of Engineering, Anhui University, China
Distinguished Visiting Professor, Tokyo Institute of Technology, Tokyo, Japan
Distinguished Alumnus, National Taipei Technological University, Taiwan
Member of Honor Societies, Phi Kappa Phi, Tau Beta Pi, and Eta Kappa Nu

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE, ASEE
INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
Member, University Retention and Tenure Committee
Chair, Dean Belle Wei’s Review Committee
Member, College of Engineering Resource Advisory Board
Member, the Regional Economic Strategic Leadership Team, Silicon Valley Joint Venture
Advisor, Chinese Institute of Engineers / USA
Advisor, Monte Jade Science and Technology Society

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Steering Committee Member, 9th Sino American Technology and Engineering Conference, 2011-2012
Steering Committee Member, 8th Sino American Technology and Engineering Conference, 2010
Chair, 7th Sino American Technology and Engineering Conference, 2006

SELECTED PUBLICATIONS (last 5 years)
Keynote speech, “Low Carbon Economy and Technology”, 3rd International Technology Transfer Summit, Shenzhen, China, November 15-20, 2010

Keynote speech, “Innovation – the University Role” 2010 International Forum on Innovation & High Tech Collaboration, Xiamen, China, September 7-11, 2010

San José State University  
Electrical Engineering Department  
CURRICULUM VITAE

NAME  
Chang Choo

ACADEMIC RANK  
Professor

DATE OF ORIGINAL APPOINTMENT  
August 1991

YEARS OF SERVICE (as of Spring 2011)  
20 years

YEAR OF ADVANCEMENT IN RANK

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<thead>
<tr>
<th>Rank</th>
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<tbody>
<tr>
<td>Professor</td>
<td>2002</td>
<td>San José State University, Electrical Engineering Department</td>
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<td>Associate Professor</td>
<td>1993</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1991</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1986</td>
<td>Worcester Polytechnic Institute, Electrical Engineering Department</td>
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TIME COMMITMENTS

- Percentage of time committed to the program: 100%
- Percentage of time available for research or scholarly activities: 40%

TEACHING RESPONSIBILITIES

EE118, EE176, EE178, EE198A, EE198B, EE263, EE278, EE297A, EE297B

EDUCATION

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<th>Degree</th>
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<th>Year</th>
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<tr>
<td>Ph.D.</td>
<td>Computer &amp; Systems Engineering</td>
<td>Rensselaer Polytechnic Institute</td>
<td>1986</td>
</tr>
<tr>
<td>MS</td>
<td>Computer &amp; Systems Engineering</td>
<td>Rensselaer Polytechnic Institute</td>
<td>1982</td>
</tr>
<tr>
<td>MS</td>
<td>Industrial Engineering</td>
<td>Seoul National University, Korea</td>
<td>1981</td>
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<tr>
<td>BS</td>
<td>Industrial Engineering</td>
<td>Seoul National University, Korea</td>
<td>1977</td>
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OTHER RELATED EXPERIENCE

Alterna Corporation, Senior Member of Technical Staff, 1999-2001

CONSULTING AND PATENTS

- Consulted with several Silicon Valley companies including National Semiconductor and Philips Semiconductor on video compression, image processing, and DSP.

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION


HONORS, GRANTS AND AWARDS

- ETRI (Korea), Design of Acoustic Echo Canceller for Wideband Audio Codec, September 2010-May 2011, $80,000.
- ETRI (Korea), Design of Hardware Accelerator IPs (Intellectual Properties) for Super Wideband Audio Codec, September 2008-January 2009, $100,000.
- ETRI (Korea), MVNO and MVOIP: Regulatory Regimes in the United States, 2006, $25,000.
- ETRI (Korea), A study on LM Dialing Parity and MVNO in the United States, 2004, $25,000.
Philips Semiconductor, **COMPARATIVE PERFORMANCE EVALUATION OF PHILIPS TRIMEDIA PROCESSOR**, June 1, 1997 - August 31, 1997, $30,000.


National Semiconductor, **C50-Based NSV (National Semiconductor Video) Compression System Development**, December 1995 - June 1996, $15,000.


**MEMBERSHIP IN PROFESSIONAL SOCIETIES**

IEEE, ACM, SPIE

**INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)**

Member of Curriculum Committee on Digital Systems with SJSU/EE.

Director of FPGA/DSP Laboratory with SJSU/EE.

Member of DesignCon 2009 Technical Review Committee, Santa Clara, California, February 2009.

Session Chair (Applications of Artificial Neural Networks in Image Processing and VLSI Session) for IS&T/SPIE Symposium on Electronic Imaging: Science and Technology, San Jose, California, 2007-1995.

**PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)**

Gave a short course, titled **FPGA Design of Video and Image Processing Algorithms (SC928)**, at the SPIE Electronic Imaging Conference on January 19, 2009, and on January 18, 2010, in San Jose, CA.

**SELECTED PUBLICATIONS (last 5 years)**


NAME
James Freeman

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1982

YEARS OF SERVICE (as of Spring 2011)
29

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Professor 1982 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program 50% (FERP)
Percentage of time available for research or scholarly activities

TEACHING RESPONSIBILITIES
Teach courses – EE98, 122, 295

EDUCATION
Degree Field Institution Year
Dr. Engr. EE University of Detroit 1968
MSE Engr. University of Detroit 1966
MS EE University of Detroit 1964
BS EE Gannon 1962

OTHER RELATED EXPERIENCE
Description Year
EE Department Chair 7/82 – 7/89
Associate Dean 1/2004 – 9/2006

CONSULTING AND PATENTS
Description Year
KLA-Tencor Short Course Development & Teaching 1998-2001
SEM Same 1996-1997

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field
CA EE

HONORS, GRANTS AND AWARDS
IEEE Millennium Award 2000
Chair FIE Conference 1994

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE, ASEE

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

SELECTED PUBLICATIONS (last 5 years)
San José State University  
Electrical Engineering Department  
CURRICULUM VITAE  

NAME  
Sotoudeh Hamedi-Hagh  

ACADEMIC RANK  
Assistant Professor  

DATE OF ORIGINAL APPOINTMENT  
January 2005  

YEARS OF SERVICE (as of Spring 2011)  
6 years  

YEAR OF ADVANCEMENT IN RANK  
Rank  
Assistant Professor  
Year  
2005  
Institution and Department  
San José State University, Electrical Engineering Department  

TIME COMMITMENTS  
Percentage of time committed to the program: 100%  
Percentage of time available for research or scholarly activities: 20%  

TEACHING RESPONSIBILITIES  
• Undergraduate EE122 Electronics I, EE124 Electronics II, EE196X CMOS RF Design  
• Graduate EE220 RFIC-I, EE223 Analog IC Design, EE296X RFIC-II  

EDUCATION  
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<tr>
<td>Ph.D.</td>
<td>ECE</td>
<td>University of Toronto</td>
<td>2004</td>
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<tr>
<td>MS</td>
<td>ECE</td>
<td>University of Toronto</td>
<td>2003</td>
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<tr>
<td>BS</td>
<td>ECE</td>
<td>University of Science and Technology</td>
<td>1993</td>
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OTHER RELATED EXPERIENCE  
• Post Doctoral Fellowship  
  University of Toronto  
  2004  

CONSULTING AND PATENTS  
• US Patent, Wireless Phase Shifted Transmitters  
  2002  

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION  

HONORS, GRANTS AND AWARDS  
• Best paper award in the 15th IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, Barcelona, Spain, 2004  
• Best paper award in the 5th Micronet R&D Annual Workshop, Aylmer, Quebec (Micronet is a network of centers of excellence in microelectronics in Canada), 2001  

MEMBERSHIP IN PROFESSIONAL SOCIETIES  
• IEEE, Solid-State Circuits Society  

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)  
• Director of Nanoelectronics Research Center at SJSU  
  2005-present  
• Faculty advisor of the IEEE and SOLES student Chapters at SJSU  
  2006-2010  

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)  
• Technical Program Committee Member of the Korean International Conference on Advanced Materials (ICAM) and International Conference on Information Science and Applications (ICISA)  
• Committee member of the College of Engineering Analog and Mixed-Signal Design and Test center

SELECTED PUBLICATIONS (last 5 years)


NAME
Lili He

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1999

YEARS OF SERVICE (as of Spring 2011)
12

YEAR OF ADVANCEMENT IN RANK

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<th>Rank</th>
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<tr>
<td>Professor</td>
<td>2005</td>
<td>San José State University, Electrical Engineering Department</td>
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<tr>
<td>Associate Prof.</td>
<td>1999</td>
<td>San José State University, Electrical Engineering Department</td>
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<tr>
<td>Associate Prof.</td>
<td>1997</td>
<td>Northern Illinois University, Electrical Engineering Department</td>
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<tr>
<td>Assistant Prof.</td>
<td>1993</td>
<td>Northern Illinois University, Electrical Engineering Department</td>
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TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 20%

TEACHING RESPONSIBILITIES
Semiconductor Devices and Circuits, VLSI technology, Electromagnetic, Senior design project advising, MSEE project advising

EDUCATION

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<th>Degree</th>
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<tr>
<td>Ph.D.</td>
<td>EE</td>
<td>SUNY at Buffalo</td>
<td>1992</td>
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<tr>
<td>MA</td>
<td>Physics</td>
<td>SUNY at Buffalo</td>
<td>1989</td>
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<tr>
<td>MS</td>
<td>EE</td>
<td>Nanjing Electronic Device Institute, China</td>
<td>1984</td>
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<tr>
<td>BS</td>
<td>Physics</td>
<td>Nanjing University, China</td>
<td>1982</td>
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OTHER RELATED EXPERIENCE

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<tr>
<td>Stanford Nanofabrication facility, Summer Research Fellow</td>
<td>2009</td>
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<tr>
<td>Faculty Summer Research Fellow, US Airforce Research lab in MA</td>
<td>1997</td>
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CONSULTING AND PATENTS

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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

<table>
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<th>State</th>
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HONORS, GRANTS AND AWARDS
National Science Foundation, CAREER Award, 1996

MEMBERSHIP IN PROFESSIONAL SOCIETIES

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Chair, IEEE Santa Clara Valley Education Society 2004-2008

SELECTED PUBLICATIONS (last 5 years)
6. Son Tran, Morris Jones, and Lili He, “Phase Aligned Clock Multiplier,” International Symposium on Signal, System and Electronics 2007, July 30 to August 2, 2007, Montreal, Canada,
7. Sijie Zheng, Jing Liu, and Lili He, “The Mixed-Signal Design of PLL with CMOS Technology”, accepted by International Symposium on Signal, System and Electronics 2007, July 30 to August 2, Montreal, Canada,
San José State University  
Electrical Engineering Department  
CURRICULUM VITAE

NAME  
Ping Hsu

ACADEMIC RANK  
Professor

DATE OF ORIGINAL APPOINTMENT  
August 1990

YEARS OF SERVICE (as of Spring 2011)  
20

YEAR OF ADVANCEMENT IN RANK  
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<th>Rank</th>
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<tbody>
<tr>
<td>Professor</td>
<td>2000</td>
<td>San José State University, Department of Electrical Engineering</td>
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<tr>
<td>Associate Professor</td>
<td>1993</td>
<td>San José State University, Department of Electrical Engineering</td>
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<tr>
<td>Assistant Professor</td>
<td>1990</td>
<td>San José State University, Department of Electrical Engineering</td>
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<tr>
<td>Assistant Professor</td>
<td>1989</td>
<td>Univ. of Illinois, Urbana-Champaign, Dept. of Mech. and Ind. Engr.</td>
</tr>
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</table>

TIME COMMITMENTS  
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 10%

TEACHING RESPONSIBILITIES  
Teaching courses in areas of Control, Microcontroller, Instrumentation Laboratory, Introduction to Engineering

EDUCATION  
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<th>Degree</th>
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<th>Year</th>
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<tr>
<td>PhD.</td>
<td>EE</td>
<td>University of California at Berkeley</td>
<td>1988</td>
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<tr>
<td>MS</td>
<td>EE</td>
<td>Southern Methodist University</td>
<td>1979</td>
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OTHER RELATED EXPERIENCE  
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<tr>
<td>Visiting Professor, Dept. of Electrical and Computer Science, University of California, Berkeley</td>
<td>1997 - 1998</td>
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<tr>
<td>Assistant Professor, Dept. of Industrial and Mechanical Eng., University of Illinois, Urbana-Champaign</td>
<td>1989 - 1990</td>
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<tr>
<td>Engineer, Navtrol Company, Dallas, Texas</td>
<td>1980 - 1983</td>
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CONSULTING AND PATENTS  
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<tr>
<td>Consultant, Xuji Wind power (China)</td>
<td>2009 - 2011</td>
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<tr>
<td>Consultant, BAE Corporation</td>
<td>2001 – 2010</td>
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<td>Consultant, GE Nuclear</td>
<td>2001 - 2003</td>
</tr>
<tr>
<td>Consultant, Trace Technologies Inc.</td>
<td>1993 - 1999</td>
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<tr>
<td>Consultant, Failure Analysis Associate.</td>
<td>1997 - 1998</td>
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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION  
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HONORS, GRANTS AND AWARDS  

MEMBERSHIP IN PROFESSIONAL SOCIETIES  
Member of IEEE.

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)  
Associate Dean of the College of Engineering, San José State University, 2001 – 2008
PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Sabbatical leave, visiting Harbin Institute of Technology, China, 2009-2010
Attended NSF sponsored faculty workshop on teaching of power electronics and systems by the Department of Electrical Engineering, University of Minnesota. (2009, 2010, 2011)

SELECTED PUBLICATIONS (last 5 years)
None.
NAME
Mallika Keralapura

ACADEMIC RANK
Assistant Professor

DATE OF ORIGINAL APPOINTMENT
August 2008

YEARS OF SERVICE (as of Spring 2011)
3

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Assistant Professor 2008 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 40%

TEACHING RESPONSIBILITIES
EE127, EE261, EE262 and other EE core classes like EE112, EE210

EDUCATION
Degree Field Institution Year
PhD Biomedical Engineering University of California at Davis 2007
MS Biomedical Engineering University of Akron, OH 2001
BS Electrical Engineering Bangalore University, India 1998

OTHER RELATED EXPERIENCE
Description Year
Post-doctoral Fellow, University of California, San Francisco 2007-2008

CONSULTING AND PATENTS
Description Year
None

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field
None

HONORS, GRANTS AND AWARDS
$23,660 + 1 class release (Fall 2009) + 1 class release (Spring 2010): Seed Support from San José State University (Fall 2009 - Fall2010) – Faculty Development Grant “Drug Delivery using Ultrasound”
$10,000 Seed Support from San José State University (Fall 2008 – Fall 2010) – New Faculty Development Grant “Cancer Diagnosis and Therapy using Ultrasound”
$5000 Seed Support from California State University Research Funds (Fall 2008 - Fall 2009) - “Towards Combined Thermo-Mechanical Imaging of Breast Cancer using Ultrasound”
$500 + 1 class release (Fall 2009) Seed Support from San José State University (Fall 2009 - Fall 2010) – “Ultrasound Strain Imaging for Prostate Thermal Therapy”
$79,772 (Fall 2010) Laboratory Refresh Program, College of Engineering
$15,500 + 2 class release (Fall 2010, Spring 2011) - Seed Support from College of Engineering, SJSU (Fall 2010-2011) “Ultrasound Imaging for Monitoring Prostate Cancer Ablation Treatments”
$15,000 Grant from CSU Program for Education and Research in Biotechnology (CSUPERB) (Fall 2010-2011) - “Trans-rectal Ultrasound Strain Imaging for Prostate Thermal Therapy”
$5000 Seed Support from California State University Research Funds (Spring 2011) - “Quantification of Mass-Transport from Microcapsules under Ultrasound Exposure Using Bright-field and Fluorescence Imaging”
MEMBERSHIP IN PROFESSIONAL SOCIETIES
Biomedical Engineering Society (BMES)
IEEE Ultrasonics, Ferroelectrics and Frequency Control (IEEE-UFFC)

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
– Department Level Service: Member of Circuits area committee, graduate committee, undergraduate committee and electronics committee
– College Level Service: Member of 2015 Task Force

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

SELECTED PUBLICATIONS (last 5 years)
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Thuy T. Le

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
January 2001

YEARS OF SERVICE (as of Spring 2011)
10

YEAR OF ADVANCEMENT IN RANK
Rank Institution and Department
Professor San José State University, Electrical Engineering Department
Associate Professor San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 20%

TEACHING RESPONSIBILITIES
Undergraduate and graduate courses in digital design area: EE120, EE177, EE138, EE271, EE272
Undergraduate and graduate general core courses: EE102, EE104, EE210, EE250
Senior design projects and M.S. projects/theses: EE198, EE297, EE299

EDUCATION
Degree Field Institution Year
Ph.D. Engineering University of California at Berkeley 1990
M.S. Engineering University of California at Berkeley 1987
B.S. Engineering University of California at Berkeley 1985

OTHER RELATED EXPERIENCE
Description Institution Year
Senior R&D Engineer Fujitsu America and Fujitsu Computer Systems Corp. 1993 to 2001
Part-time faculty San José State University, Electrical Engineering Department 1996 to 2000
Senior Research Engineer Savannah River National Laboratory 1990 to 1993
Senior Lecturer University of South Carolina, Mathematical Eng. Dept. 1991 to 1993
Assistant Research Scientist Lawrence Berkeley National Laboratory 1988 to 1990
Physics Instructor College of Alameda, Applied Science and Art Department 1988 to 1990

CONSULTING AND PATENTS
Description Institution Year
Consultant, Fujitsu Computer System Corporation, Sunnyvale, California 2001 - 2009
Consultant, Sierra Nuclear Corporation, Scotts Valley, California 1989 - 1997

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field

HONORS, GRANTS AND AWARDS
· $1.4M NSF grant for joint research with SJSU and U.C. Berkeley faculty members (2006 to 2010)
· SJSU College of Engineering Development Grants from 2001 to date
· SJSU College of Engineering Best Service Award (2006)
· Fujitsu America grants in High Performance Computing research (2002 to 2004)
· Several professional awards such as George Westinghouse Signature Award, SRL Total Quality awards, etc...

MEMBERSHIP IN PROFESSIONAL SOCIETIES
Member, Institute of Electrical and Electronics Engineer

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
· Member of Editorial Board of “Special Issue of the Science & Technology Development Journal of VNU-HCM,” ISSN 1859-0128 (2010)
· Committee Chairman of the International Conference on Nuclear Power Plant Technology and Safety (2010)
· Program Co-chair of the 6th IEEE International Conference on Computer and Information Science (ICIS 2007)
· Technical Program Committee of the 2006 Grid Benchmark Workshops at the International Parallel and Distributed Processing Symposiums (sponsored by IEEE and ACM SIGARCH)
· Technical Reviewer, Program Committee Member, and Session Chair of the IEEE/ACIS International Conference on Computer and Information Science (ICIS2006)
· Technical Reviewer and Session Chair of the International Conferences on Computing, Communications, and Control Technologies (CCTC2006)

**PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)**
· Invited speaker, American Nuclear Society Northern California Chapter Dinner Banquet, California (2010)

**SELECTED PUBLICATIONS (last 5 years)**
11. Thuy T. Le, John H. Levan, Patricio I. Meneses, "High-Performance and Grid Computing for Study and Research in Infectious Diseases," Proceedings of the Scientific Conference on Infectious Diseases and Tropical Medicine – Military Medical University of Vietnam & U.S. Naval Institute for Dental and Biomedical Research (NIDBR), 2006
NAME
Essam A. Marouf

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1990

YEARS OF SERVICE (as of Spring 2011)
21

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Professor 1990 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 40%

TEACHING RESPONSIBILITIES
Graduate and undergraduate courses in the areas of Signals & Systems, Linear Systems, Digital and Statistical Signal Processing, Digital Communications, Signal Processing in Communications

EDUCATION
Degree Field Institution Year
Ph.D. EE/CS-Minor Stanford University 1975
M.S EE University of Alexandria, Egypt 1968
B.S. EE University of Alexandria, Egypt 1965

OTHER RELATED EXPERIENCE
Description Year
Senior Research Scientist, E.E. Dept., Stanford University 8/81 – 8/90
Research Associate, E.E. Dept., Stanford University 8/78 – 8/81
Assistant Professor, E.E. Dept., University of Alexandria, Egypt 8/75 – 8/78

CONSULTING AND PATENTS
Description Year
Principal Investigator and Team Member, Cassini Radio Science Team 1991 -
Co-Investigator, Rosetta Radio Science Investigation Team 1995 -
Member of the NASA Outer Planets Science Working Group 1993 - 1995
Associate Team Member, Voyager Radio Science Team 1980 - 1989
Member of the Science Working Groups for the Voyager Saturn, Uranus, and Neptune encounters 1980 - 1989
Co-investigator on many completed research projects 1975 – 2011

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field
NONE

HONORS, GRANTS AND AWARDS
NASA Certificate of Appreciation Award for "exceptional scientific and engineering design of the Voyager 1 Saturn's ring occultation and scattering experiments," 1981.
SJSU College of Engineering “Excellence in Scholarship” Award, 2001
SJSU President Scholar Award, 2007
Yearly NASA/JPL funding to participate in the International Cassini Mission to the Saturn System: 1991- present

MEMBERSHIP IN PROFESSIONAL SOCIETIES
American Astronomical Society/Division of Planetary Sciences (AAS/DPS)
American Geophysical Union (AGU)

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
Chair, College of Engineering Research Committee: 2010 - present

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Member, Radio Science Team, NASA/ESA International Cassini Mission to Saturn
Member, Radio Science Instrument Team, ESA/NASA International Rosetta Mission to a Comet
Member of the Science Working Groups for Rings and Atmospheres of the Cassini Mission to Saturn

SELECTED PUBLICATIONS (last 5 years)
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Nader F. Mir

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 2001

YEARS OF SERVICE (as of Spring 2011)
10

YEAR OF ADVANCEMENT IN RANK

<table>
<thead>
<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Professor</td>
<td>2005</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>2001</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>1996</td>
<td>University of Kentucky, Electrical Engineering Department</td>
</tr>
</tbody>
</table>

TIME COMMITMENTS
Percentage of time committed to the program 100%
Percentage of time available for research or scholarly activities 40%

TEACHING RESPONSIBILITIES
EE110, EE160, EE181, EE250, EE283, EE284

EDUCATION

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>Electrical Eng.</td>
<td>Washington University</td>
<td>1995</td>
</tr>
<tr>
<td>B.Sc.</td>
<td>Electrical Eng.</td>
<td>Polytechnic University</td>
<td>1985</td>
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OTHER RELATED EXPERIENCE

<table>
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<th>Year</th>
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</thead>
<tbody>
<tr>
<td>Research Scientist, Stevens Institute of Technology</td>
<td>1994-1996</td>
</tr>
<tr>
<td>Research Assistant, Washington University</td>
<td>1989-1994</td>
</tr>
<tr>
<td>Senior Telecomm R&amp;D Engineer for TRDC</td>
<td>1984-1988</td>
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CONSULTING AND PATENTS

<table>
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<th>Description</th>
<th>Year</th>
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</table>
5. **Grant:** Co-PI, Agency: CSU Research Award, Title: *Research Excellence (Development Grant) Award, Design and Analysis of Smart Sensor Networks*, Submitted: May, 2006, Duration: 1 year: August 1, 2006 to July 30, 2007.

**MEMBERSHIP IN PROFESSIONAL SOCIETIES**
1. Senior Member: Institute of Electrical & Electronic Engineers (IEEE)
2. Senior Member: IEEE Communications Society

**INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)**
o. **Department Associate Chair**, Electrical Engineering Department, SJSU, 2006-08
o. **Director, Off-Campus SJSU-MSE Academic Programs,**
   o. KLA-Tencor Corp. CA, MSE Optical Sensors and Networks Program, since 2007.
   o. MBA/MSE Dual-Degree, since 2009.
   o. MS-EE with emphasis on Analog and Mixed Signals, since 2010.

**PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)**

**SELECTED PUBLICATIONS (last 5 years)**

**Text Book Authored**

**Journal Publications**
San José State University  
Electrical Engineering Department  
CURRICULUM VITAE

NAME  
Robert Morelos-Zaragoza

ACADEMIC RANK  
Associate Professor

DATE OF ORIGINAL APPOINTMENT  
August 2002

YEARS OF SERVICE (as of Spring 2011)  
9

YEAR OF ADVANCEMENT IN RANK  

<table>
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<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Associate Professor</td>
<td>2002</td>
<td>San José State University, Electrical Engineering</td>
</tr>
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TIME COMMITMENTS  
Percentage of time committed to the program: 100%  
Percentage of time available for research or scholarly activities: 20%

TEACHING RESPONSIBILITIES  
Communication systems  
Probability and random processes  
Radio-frequency identification (RFID) systems  
Error Correcting Coding

EDUCATION  

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>Electrical Engineering</td>
<td>University of Hawaii</td>
<td>1992</td>
</tr>
<tr>
<td>M.S.</td>
<td>Electrical Engineering</td>
<td>National Autonomous University of Mexico</td>
<td>1987</td>
</tr>
<tr>
<td>B.S.</td>
<td>Electrical Engineering</td>
<td>National Autonomous University of Mexico</td>
<td>1985</td>
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OTHER RELATED EXPERIENCE  

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<thead>
<tr>
<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>Researcher, Sony Computer Science Laboratories</td>
<td>1999</td>
</tr>
<tr>
<td>Staff Member, Channel Coding, LSI Logic Corp.</td>
<td>1997</td>
</tr>
<tr>
<td>Research Associate, Imai Laboratory, The University of Tokyo, Japan</td>
<td>1995</td>
</tr>
<tr>
<td>Research Fellow, Nara Institute of Science and Technology, Japan</td>
<td>1994</td>
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<tr>
<td>Research Associate, Kasami Laboratory, Osaka University, Japan</td>
<td>1993</td>
</tr>
<tr>
<td>Assistant Professor, Instituto Tecnologicoy de Estudios Superiores, Monterrey (ITESM), Mexico</td>
<td>1992</td>
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CONSULTING AND PATENTS  

<table>
<thead>
<tr>
<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>Error Correction for a Chinese Mobile Digital Television Receiver, Iberium (Consulting)</td>
<td>2008</td>
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<td>Error Correction for Flash Memories, SanDisk Corporation (Consulting)</td>
<td>2006</td>
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<tr>
<td>Error Correction for Memory Devices, Intel Corporation (Consulting)</td>
<td>2004</td>
</tr>
<tr>
<td>Universal Platform for Software Defined Radio, U.S. patent No. 6,823,181</td>
<td>2004</td>
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<tr>
<td>Modulation format identification device and method of same, U.S. patent No. 6,804,309</td>
<td>2004</td>
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<tr>
<td>Decoder for Iterative Decoding of Binary Cyclic Codes, U.S. patent No. 6,751,770</td>
<td>2004</td>
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<tr>
<td>Hybrid State Machine for Frame Synchronization, U.S. patent No. 6,741,613</td>
<td>2004</td>
</tr>
<tr>
<td>Reed-Solomon decoder, U.S. Patent No. 6,487,692</td>
<td>2002</td>
</tr>
<tr>
<td>Method and apparatus for fast decoding of a Reed-Solomon code, U.S. Patent No. 6,081,920</td>
<td>2000</td>
</tr>
<tr>
<td>Decoding trellis coded modulated data with a Viterbi decoder, U.S. Patent No. 6,138,265</td>
<td>2000</td>
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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION  

<table>
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<th>State</th>
<th>Field</th>
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</table>
HONORS, GRANTS AND AWARDS
Visiting Fellow, Japanese Society for the Promotion of Science, Osaka University, January 2009
Member, Eta Kappa Nu, 1992
Chairman, IEEE University of Hawaii Student Branch, 1991

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE Communications Society, IEEE Information Theory Society

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
Program Assessment Coordinator, Electrical Engineering Department, San José State University 2007-2011

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Reviewer:
· IEICE Transactions on Communications, 2000-2010.
· IEEE Transactions on Vehicular Tech., 2004-2010
· IEEE Communications Letters, 2002-2008
· IEEE Transactions on Communications, 2000-2008
· IEEE Transactions on Wireless Communications, 2002-2003 and 2005-2010
Technical Program Committee Member:
· GLOBECOM 2006 and ISITA 2006
· ISWPC 2007 and WCECS 2007
· RWS 2009 and ICC 2009
· RWS 2010, ISITA 2010 and ICCST 2010
· ICC 2011, MobiCONA 2011

SELECTED PUBLICATIONS (last 5 years)
San José State University
Electrical Engineering Department

CURRICULUM VITAE

NAME
Gene Moriarty

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
Sept 1975 (Part-Time) and Sept 79 (Full-Time)

YEARS OF SERVICE (as of Spring 2011)
31

YEAR OF ADVANCEMENT IN RANK

<table>
<thead>
<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Professor</td>
<td>1987</td>
<td>San José State University</td>
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<tr>
<td>Associate Professor</td>
<td>1984</td>
<td>San José State University</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1980</td>
<td>San José State University</td>
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</table>

TIME COMMITMENTS
Percentage of time committed to the program: 50% (FERP)
Percentage of time available for research or scholarly activities: 25%

TEACHING RESPONSIBILITIES
Circuits, Systems, Controls, Ethics

EDUCATION

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD</td>
<td>EE</td>
<td>Illinois Institute of Tech</td>
<td>1975</td>
</tr>
<tr>
<td>MS</td>
<td>EE</td>
<td>University of Illinois</td>
<td>1968</td>
</tr>
<tr>
<td>BS</td>
<td>Engr. Physics</td>
<td>University of Illinois</td>
<td>1966</td>
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OTHER RELATED EXPERIENCE

<table>
<thead>
<tr>
<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>Professor and Undergraduate Advising Coordinator, Electrical Engineering Department, San José State University.</td>
<td>1999-2005</td>
</tr>
<tr>
<td>Professor and Associate Chair, Electrical Engineering Department, San José State University.</td>
<td>1998-1999</td>
</tr>
<tr>
<td>Director, General Engineering and Information Engineering Programs, Computer, Information, &amp; Systems Engineering Department, San José State University.</td>
<td>1997-1998</td>
</tr>
<tr>
<td>Interim Chair, Computer, Information, &amp; Systems Engineering Department, San José State University.</td>
<td>1996-1997</td>
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CONSULTING AND PATENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>Served as a consultant for Searle Ultrasound, Santa Clara, CA, in the area of control system design, using lead-lag compensation, of a body-scanning machine.</td>
<td>1978</td>
</tr>
</tbody>
</table>

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

HONORS, GRANTS AND AWARDS

MEMBERSHIP IN PROFESSIONAL SOCIETIES

IEEE
ASEE
SPT (Society for Philosophy and Technology)

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

SELECTED PUBLICATIONS (last 5 years)

Paper to be presented 2011 in Ireland (Belfast) "Focal, Local, and Global Dimensions of Engineering Practice" for ICEE-2011 conference organized by University of Ulster and iNEER, August 21-26, 2011.


San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Masoud Mostafavi

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1990

YEARS OF SERVICE (as of Spring 2011)
21

YEAR OF ADVANCEMENT IN RANK

<table>
<thead>
<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Professor on FERP</td>
<td>2008</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Professor</td>
<td>1990</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>1986</td>
<td>University of Missouri, Electrical Engineering Department</td>
</tr>
<tr>
<td>Research Scientist</td>
<td>1983</td>
<td>Superior School of Electricity, France</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1978</td>
<td>University Complex for Engineering and Technology</td>
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</table>

TIME COMMITMENTS
Percentage of time committed to the program: 50% (FERP)
Percentage of time available for research or scholarly activities: As much as possible

TEACHING RESPONSIBILITIES
Electromagnetics, Wireless and mobile communications, Microwaves, Circuit Theory

EDUCATION

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>Electrical Engineering</td>
<td>University of Illinois, Urbana</td>
<td>1975</td>
</tr>
<tr>
<td>M.S.</td>
<td>Electrical Engineering</td>
<td>University of Illinois, Urbana</td>
<td>1970</td>
</tr>
<tr>
<td>B.S.</td>
<td>Electrical Engineering</td>
<td>University of Illinois, Urbana</td>
<td>1968</td>
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OTHER RELATED EXPERIENCE

<table>
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<tr>
<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>I have taught many courses at both graduate and undergraduate levels including: mobile/wireless communications, electromagnetics, fields and waves, advanced electromagnetics, microwaves, antenna theory and design, and circuit theory.</td>
<td></td>
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CONSULTING AND PATENTS

<table>
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<th>Year</th>
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<tbody>
<tr>
<td>Various Diverse Small Projects</td>
<td>1998 -</td>
</tr>
<tr>
<td>Silicon wireless: Antenna design options</td>
<td>1998</td>
</tr>
<tr>
<td>Hewlett-Packard: Local multi-point distribution System (LMDS)</td>
<td>1994- 1996</td>
</tr>
<tr>
<td>Savi Technologies: Consultant on Small Antennas</td>
<td>1991-1992</td>
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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

<table>
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<tr>
<th>State</th>
<th>Field</th>
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HONORS, GRANTS AND AWARDS
High Honors (BS Degree)
Royal Recognition for Excellence (1967)
Officially invited to join the Electromagnetic Academy, 1990
Elected Senior Member of IEEE, 1992

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE, Senior Member

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
– Interim Chair, EE Department Fall 02- Jan. 04
– University RTP 2000-2001
– Associate Chair, EE Dept. Spring 2000, Fall 2001, Spring 2002
– Department Faculty Recruitment Committee (1997-present)
– Department Curriculum Committee (1998-present)
– College Graduate Studies and Research Committee (1998-present)

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

SELECTED PUBLICATIONS (last 5 years)
San José State University  
Electrical Engineering Department  
CURRICULUM VITAE

NAME  
David Wahlgren Parent

ACADEMIC RANK  
Associate Professor

DATE OF ORIGINAL APPOINTMENT  
August 1999

YEARS OF SERVICE (as of Spring 2011)  
12

YEAR OF ADVANCEMENT IN RANK

<table>
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<tr>
<th>Rank</th>
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<tr>
<td>Associate Professor</td>
<td>2005</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1999</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
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TIME COMMITMENTS

Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 20%

TEACHING RESPONSIBILITIES

EDUCATION

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<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>Electrical Engineering</td>
<td>University of Connecticut</td>
<td>1999</td>
</tr>
<tr>
<td>MS</td>
<td>Electrical Engineering</td>
<td>University of Connecticut</td>
<td>1996</td>
</tr>
<tr>
<td>BS</td>
<td>Electrical Engineering</td>
<td>University of Connecticut</td>
<td>1992</td>
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</tbody>
</table>

OTHER RELATED EXPERIENCE

Description Year

CONSULTING AND PATENTS

Description Year

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

State Field

HONORS, GRANTS AND AWARDS

NSF EAGER Grant (PI $57k) 2009
EEC NSF Grant (CO-PI $149k) 2009
DMEA Grant (Co-PI, $12k) 2008
Intel California Public Affairs Equipment Grant (PI $15k) 2006
Charles Babbage Grant, Synopsys (PI $25k) 2006
NSF CCLI (Co-PI) 2005
Intel California Public Affairs Equipment Grant (Co-PI $40k) 2004
Cadence Design Systems Curriculum Development (PI $499k) 2001-2003
NSF Course, CCLI Grant (Co-PI $475K) 2000-2003
SME Laboratory Improvement Grant (Co-PI $70k) 2000

MEMBERSHIP IN PROFESSIONAL SOCIETIES

IEEE

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)

Director VLSI CAD Lab:
4 Cadence software CMOS design tutorials
10 successful CMOS chip designs through MOSIS
2 TCAD tutorials, 15 TCAD case studies
http://www.engr.sjsu.edu/~dparent/ICGROUP/index.htm

Outreach:
Solar Cell Fabrication Class, Tech Academy (2009)
Solar Energy 5’th Los Paseos grade GATE educational experience (2008)

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
16’th Bi Annual University, Government, Industry Microelectronics:
2006 Conference Chair
Technical reviewer 2006, and 2007

Technical Reviewer:

SELECTED PUBLICATIONS (last 5 years)
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Peter Reischl

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1982

YEARS OF SERVICE (as of Spring 2011)
29

YEAR OF ADVANCEMENT IN RANK

<table>
<thead>
<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Professor</td>
<td>1986</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>1982</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Adjunct Professor</td>
<td>1982</td>
<td>University of California at Irvine, CEM Department</td>
</tr>
<tr>
<td>Assistant Adjunct Professor</td>
<td>1978</td>
<td>University of California at Irvine, CEM Department</td>
</tr>
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</table>

TIME COMMITMENTS

Percentage of time committed to the program: 50% (FERP)
Percentage of time available for research or scholarly activities: 10%

TEACHING RESPONSIBILITIES

2000-2004 Associate Dean for Research & Graduate Studies, CoE, SJSU
2004-2006 100%
2006-2010 80% [EE Graduate Coordinator]

EDUCATION

<table>
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<th>Degree</th>
<th>Field</th>
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<th>Year</th>
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<tbody>
<tr>
<td>MS</td>
<td>EE</td>
<td>California State University, San José</td>
<td>1971</td>
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<tr>
<td>BS</td>
<td>EE</td>
<td>California State University, San José</td>
<td>1969</td>
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OTHER RELATED EXPERIENCE

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<tbody>
<tr>
<td>Visiting Prof., Electrical Engineering, Power Electronics and Controls, Univ. of Wisconsin, Madison</td>
<td>1990, 1991</td>
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<tr>
<td>Postdoctoral Fellow, Department of Biomedical Engineering, Univ. of Southern California</td>
<td>1976-1978</td>
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CONSULTING AND PATENTS

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<thead>
<tr>
<th>Description</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>Science Advisory Council, UTEK Corporation,</td>
<td>2000-2010</td>
</tr>
<tr>
<td>Technical Advisory Board, Light Engineering</td>
<td>2003</td>
</tr>
<tr>
<td>Advisory to the IEEE Santa Clara Valley Chapter of the Power Engineering Society</td>
<td>1995-2000</td>
</tr>
<tr>
<td>Ad-Com: IEEE-IAS, Santa Clara Valley</td>
<td>2000</td>
</tr>
<tr>
<td>Consultant, PARTOE Inc, Power Electronics</td>
<td>2009, 2010</td>
</tr>
<tr>
<td>Consultant, Green Ray Technologies, LLC, Power Electronics</td>
<td>2008, 2009</td>
</tr>
<tr>
<td>Consultant, Dechert, LLP, Power Electronics</td>
<td>2008</td>
</tr>
<tr>
<td>Consultant, iWatt, Los Gatos, CA, Power Electronics</td>
<td>2004</td>
</tr>
<tr>
<td>Consultant, Northrop Grumman, Power Electronics</td>
<td>1999</td>
</tr>
<tr>
<td>Consultant, R. Lynette &amp; Associates, Power Electronics, San Jose, CA</td>
<td>1995-1996</td>
</tr>
<tr>
<td>Consultant, General Electric, Power Electronics</td>
<td>1993-1995</td>
</tr>
<tr>
<td>Consultant, IBM, Power Electronics</td>
<td>1992</td>
</tr>
<tr>
<td>Consultant, Lawrence Livermore Lab, Power Electronics</td>
<td>1991</td>
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</table>
## PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

<table>
<thead>
<tr>
<th>State</th>
<th>Field</th>
</tr>
</thead>
</table>

## HONORS, GRANTS AND AWARDS

- Tau Beta Pi
- Phi Kappa Phi
- Eta Kappa Nu
- Nominated Outstanding Professor by Eta Kappa Nu, 1985
- DoE/U. of Minnesota Research Subaward, Power Electronics Curriculum, 2010-2012
- PG&E, Initiating the Power Electronics Controls Laboratory, 1988-1993
- General Electric, Compact Driver and Controller for a Three Phase Stepping Motor, 1993-1994
- Teledyne, Advanced Switch-mode Battery Charger Controller, 1992
- EPRI, Status and Trend Assessment of Advanced Battery Charging Technologies, 1990
- U.S. Department of Agriculture, Apply of Control Theory in Human and Animal Calorimetry, 1983-1986

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

- IEEE
- American Physiological Society
- International Society of Biotelemetry

## INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)

- MSEE Graduate Coordinator, 2006-2010
- Associate Dean for Research & Graduate Studies, COE, 2000-2004

## PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

- EE Dep., SJSU, member of U. of Minnesota/DoE Dev. of Undergraduate Curriculum in Energy, 2010-2013
- Workshop participant, University of Minnesota, Revitalizing the Curriculum in Power Electronics, Drives and Power System, 2008 & 2009

## SELECTED PUBLICATIONS (last 5 years)
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Jalel Rejeb

ACADEMIC RANK
Associate Professor

DATE OF ORIGINAL APPOINTMENT
August, 2000

YEARS OF SERVICE (as of Spring 2011)
11

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Associate Professor 2006 San José State University, Electrical Engineering Department
Assistant Professor 2000 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 30%

TEACHING RESPONSIBILITIES
Teach undergraduate and graduate courses in areas of Circuits, Systems, and Networking

EDUCATION
Degree Field Institution Year
Ph.D. Electrical Engineering Syracuse University 1997
MS Electrical Engineering Syracuse University 1990
BS Electrical Engineering Syracuse University 1988

OTHER RELATED EXPERIENCE
Description Year
Tuskegee University, electrical engineering dept, Assistant Professor 1997-2000
Engineer, HP, Palo Alto, California, Microprocessor System Group 1998-1999

CONSULTING AND PATENTS
Description Year
Cisco, San Jose, CA, VoIP, and router performance enhancement 2000-present
CITS Group. Inc, IT expert, Cloud Computing and Security 2008-present

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field

HONORS, GRANTS AND AWARDS
Outstanding Faculty Performance award, 2000

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE, ACM member since 1998

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
Cisco lab director, SJSU, since 2000 to present
I developed a lab manual that supports Computer Network courses by providing students hands-on experience in networking. The objective is to enhance student skills in designing and testing real-world networks using state-of-the art Cisco routers and equipment

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Written 2 chapters in new a textbook, titled “Internet Security for Engineers”, Publisher Cengage Learning, 2012
SELECTED PUBLICATIONS (last 5 years)

San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Avtar Singh

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August 1987

YEARS OF SERVICE (as of Spring 2011)
23

YEAR OF ADVANCEMENT IN RANK

<table>
<thead>
<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Professor</td>
<td>1994</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>1987</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
</tbody>
</table>

TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 10%

TEACHING RESPONSIBILITIES
Graduate and undergraduate courses in the area of digital design and DSP

EDUCATION

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>EE</td>
<td>City University of New York, New York</td>
<td>1982</td>
</tr>
<tr>
<td>M.E.</td>
<td>EE</td>
<td>City College of New York, New York</td>
<td>1974</td>
</tr>
<tr>
<td>M.Tech.</td>
<td>EE</td>
<td>Indian Institute of Technology, Delhi</td>
<td>1971</td>
</tr>
<tr>
<td>B.Sc.</td>
<td>EE</td>
<td>Punjab University, Chandigarh</td>
<td>1969</td>
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OTHER RELATED EXPERIENCE

<table>
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<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Visiting Professor, IIT Ropar and Guru Nanak Dev University, India</td>
<td>2010</td>
</tr>
<tr>
<td>Visiting Professor, IIT Madras, India</td>
<td>1996</td>
</tr>
<tr>
<td>Vice President, Vivix Corp., Milpitas, CA.</td>
<td>1985 - 1987</td>
</tr>
<tr>
<td>Senior Electronics Engineer, Anderson Jacobson Inc., San Jose, CA.</td>
<td>1983 - 1985</td>
</tr>
<tr>
<td>Section Head, National Semiconductor, Santa Clara, CA.</td>
<td>1982 - 1983</td>
</tr>
<tr>
<td>Assistant Professor, County College of Morris, Randolph, NJ.</td>
<td>1978 - 1982</td>
</tr>
<tr>
<td>Assistant Professor/Assistant Director, Metropolitan Tech. Institute, Saddlebrook, NJ.</td>
<td>1974 - 1978</td>
</tr>
<tr>
<td>Adjunct Lecturer, City College of New York, New York.</td>
<td>1972 - 74, 80</td>
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CONSULTING AND PATENTS

<table>
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<tr>
<td>Consultant, Alien Technology, Morgan Hill, CA</td>
<td>2005 - 2006</td>
</tr>
<tr>
<td>Consultant, Karta Systems, Palo Alto, CA</td>
<td>2003</td>
</tr>
<tr>
<td>Technical Advisor, United Nations Industrial Development Organization</td>
<td>1996</td>
</tr>
<tr>
<td>Consultant, Microcomputer Directions, Fremont, CA.</td>
<td>1996 - 1998</td>
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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

HONORS, GRANTS AND AWARDS

MEMBERSHIP IN PROFESSIONAL SOCIETIES
Member IEEE and ASEE
INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
Department Chair from 2006 to 2010: Recruited 3 new faculty members, upgraded 6 labs, established new bioinstrumentation lab, upgraded graduate and undergraduate curricula, established endowed chair in mixed signals, established off-campus program in mixed signals, established department tutoring program, provided financial support to faculty for projects and theses, managed balanced budget, provided travel and computer support for all valid requests, provided student assistants to all faculty, established department server for records and meetings, created department marketing literature, recruited department admin coordinator

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
- Attended many short courses, conferences, and National Chairs’ Meetings
- Participated in sponsoring Graduate Projects and Theses
- Served as department RTP Committee Chair

SELECTED PUBLICATIONS (last 5 years)
Q. Quan, B. Sirkeci-Mergen, A. Singh, Distributed Space-Time Codes with Preprocessing over Multiple Stages of Relays”, International Conference on Future Challenges in Wireless Communication, Nov. 27-29, 2010, Chandigarh, India


NAME
Birsen Sirkeci

ACADEMIC RANK
Assistant Professor

DATE OF ORIGINAL APPOINTMENT
August 2007

YEARS OF SERVICE (as of Spring 2011)
4

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Assistant Professor 2007 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 100%
Percentage of time available for research or scholarly activities: 40%

TEACHING RESPONSIBILITIES
EE250 - Probability, Random Variables and Stochastic Processes (graduate level)
EE255 - Wireless/Mobile Communications (graduate level)
EE296C - Advanced Wireless Communications (graduate level)
EE296B – Principles of Wireless Communications Laboratory (graduate level)
EE160/161 - Digital Communication Systems (undergraduate level)
EE102 - Probability and Statistical Signal Analysis (undergraduate level)

EDUCATION
Degree Field Institution Year
Ph.D. Electrical and Computer Engineering Cornell University, Ithaca, NY 2006
MS Electrical and Computer Engineering Northeastern University, Boston, MA 2001
BS Electrical Engineering and Mathematics Middle East Tech. Univ, Turkey 1998

OTHER RELATED EXPERIENCE
Description Year
Professional Leave from SJSU 2010 - 2011
Postdoctoral Researcher, UC Berkeley, Berkeley, CA 2006 - 2007
Research Intern, DoCoMo Communications Laboratories USA, Inc 2006 - 2006
Research/Teaching Assistant, Cornell University, Ithaca, NY. 2002 - 2006

CONSULTING AND PATENTS
Description Year
Methods and Systems for Space-time Coding for Distributed Cooperative Communication 2008-2009
Joint inventor with A. Scaglione, Cornell Research Foundation, Inc.

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

HONORS, GRANTS AND AWARDS
○ PI, “Refreshment of wireless communications laboratory” ($55K), SJSU College of Engineering (CoE) Laboratory
○ Refresh Program, granted March 2010.
○ PI, “Conducting student research in the field of wireless communication”, (California State University) CSU
○ Research Mini Grant ($5K), granted March 2007.
○ Award: Received the Fred Ellersick Award, which is given to the best unclassified paper in Milcom 2005.

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE, SWE
INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)

University Service:
EE Department Communication/DSP Committee, 2007-2010
EE Department Faculty Grievance Committee, 2008-2010
EE Department Graduate Curriculum Committee, 2008-2010
EE Department Lab Committee, 2009-2010
EE Department Student Recruitment Committee, 2009-2010
EE Faculty Recruitment Committee, 2009-2010
College of Engineering Graduate Curriculum Committee, 2009-2010
College of Engineering Research Committee, 2009-2010
SJSU/CSU Grant Committee, 2010 (university level)

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)


**Reviewer Activities:**

SELECTED PUBLICATIONS (last 5 years)


NAME
Udo Strasilla

ACADEMIC RANK
Professor

DATE OF ORIGINAL APPOINTMENT
August, 1980

YEARS OF SERVICE (as of Spring 2011)
30

YEAR OF ADVANCEMENT IN RANK

<table>
<thead>
<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tr>
<td>Professor</td>
<td>1985</td>
<td>San José State University, Electrical Engineering Department</td>
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<tr>
<td>Associate Professor</td>
<td>1980</td>
<td>San José State University, Electrical Engineering Department</td>
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TIME COMMITMENTS

Percentage of time committed to the program: 50% (FERP)
Percentage of time available for research or scholarly activities: 10%

TEACHING RESPONSIBILITIES

EE122 Lecture and Lab
EE124 Lecture and Lab
EE128 Lecture and Lab
EE98 Lecture and EE101 Lab
EE175 Lecture
EE211 Lecture
EE212 Lecture
EE198 A & B Projects
EE298 MS Projects
EE299 MS Theses

EDUCATION

<table>
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<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>E.E.</td>
<td>Swiss Federal Institute of Technology (ETH)</td>
<td>1973</td>
</tr>
<tr>
<td>Prof. Degree</td>
<td>E.E.</td>
<td>Massachusetts Institute of Technology (MIT)</td>
<td>1969</td>
</tr>
<tr>
<td>M.S.</td>
<td>E.E.</td>
<td>Massachusetts Institute of Technology (MIT)</td>
<td>1968</td>
</tr>
<tr>
<td>B.S.</td>
<td>E.E.</td>
<td>Texas Technological University</td>
<td>1960</td>
</tr>
</tbody>
</table>

OTHER RELATED EXPERIENCE

Description
Senior Electrical Engineer, EG&G Reticon Corporation
Res. Assistant & Instructor, ETH, Dept. of Adv. El. Eng., Zurich, Switzerland
Research Assistant, MIT Center for Space Research, Cambridge, Mass.
Senior Engineer, Harvard University, Solar Satellite Project, Cambridge, Mass.
Engineer, RCA Electronic Data Processing System, Natick, Mass.

CONSULTING AND PATENTS

Description
Consultant, EGG Reticon
Consultant, PKI Corporation

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

<table>
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<th>State</th>
<th>Field</th>
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<tbody>
<tr>
<td>US</td>
<td>Federal Aviation Administration: Private Pilot</td>
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</table>

HONORS, GRANTS AND AWARDS
o SJSU IRC (Instructional Resource Center) Grant for Remote Lab.
o Several lab development grants.
o NASA grant on research of SAWs (Surface Acoustic Wave devices).
o DHV (German Hang-gliding/Parapente Association) award for co-invention/development of parapente and kite-sail.
o RCA award for contribution on high-speed memory system.
o ETH (Swiss Federal Institute of Technology) silver medal for outstanding PhD dissertation.

MEMBERSHIP IN PROFESSIONAL SOCIETIES
  Member, Institute of Electrical and Electronics Engineers (IEEE)
  Member, Aircraft Owners and Pilot Association (AOPA)

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
  EE122, EE124 coordinator.
  RTP-committee.
  EE Governance committee.
  Lab and Curriculum committees.

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
  Developed Remote Lab experiments.

SELECTED PUBLICATIONS (last 5 years)
B2. Vitae of Part-time (Lecturer) Faculty

San José State University
Electrical Engineering Department
CURRICULUM VITAE

<table>
<thead>
<tr>
<th>NAME</th>
<th>ACADEMIC RANK</th>
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<tbody>
<tr>
<td>Tri Dinh</td>
<td>Lecturer A</td>
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**DATE OF ORIGINAL APPOINTMENT**
January 1999

**YEARS OF SERVICE (as of Spring 2011)**
12

**YEAR OF ADVANCEMENT IN RANK**

<table>
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<th>Rank</th>
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<th>Institution and Department</th>
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<tbody>
<tr>
<td>Lecturer A</td>
<td>1999</td>
<td>San José State University, Electrical Engineering Department</td>
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</table>

**TIME COMMITMENTS**

| Percentage of time committed to the program: | 10 |
| Percentage of time available for research or scholarly activities: | |

**TEACHING RESPONSIBILITIES**

Undergraduate and graduate courses in digital design area: EE 177

**EDUCATION**

<table>
<thead>
<tr>
<th>Degree</th>
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<th>Year</th>
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<tr>
<td>MS</td>
<td>Engineering</td>
<td>Santa Clara University</td>
<td>1995</td>
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<tr>
<td>BS</td>
<td>Engineering</td>
<td>California State University, Sacramento</td>
<td>1986</td>
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**OTHER RELATED EXPERIENCE**

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<th>Description</th>
<th>Institution</th>
<th>Year</th>
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<tbody>
<tr>
<td>Part-time faculty</td>
<td>San José State University, Electrical Engineering Department</td>
<td>1999 to date</td>
</tr>
<tr>
<td>Sr. Design Engineer</td>
<td>Extreme Networks, California</td>
<td>2008 to date</td>
</tr>
<tr>
<td>Sr. Design Engineer</td>
<td>Cisco System, California</td>
<td>1998 to 2008</td>
</tr>
<tr>
<td>Sr. Design Engineer</td>
<td>Adaptec Corp., California</td>
<td>1993 to 1998</td>
</tr>
<tr>
<td>Sr. Design Engineer</td>
<td>Amdahl Corp., California</td>
<td>1991 to 1993</td>
</tr>
<tr>
<td>Design Engineer</td>
<td>Kaiser Electronic, California</td>
<td>1987 to 1990</td>
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**CONSULTING AND PATENTS**

<table>
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<tr>
<th>Description</th>
<th>Year</th>
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**PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION**

<table>
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<tr>
<th>State</th>
<th>Field</th>
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**HONORS, GRANTS AND AWARDS**

**MEMBERSHIP IN PROFESSIONAL SOCIETIES**

**INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)**

**PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)**

**SELECTED PUBLICATIONS (last 5 years)**
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Khosrow Ghadiri

ACADEMIC RANK
Lecturer

DATE OF ORIGINAL APPOINTMENT
Spring 1984

YEARS OF SERVICE (as of Spring 2011)
17 Years

YEAR OF ADVANCEMENT IN RANK

Rank Year Institution and Department

TIME COMMITMENTS
Percentage of time committed to the program: 80%
Percentage of time available for research or scholarly activities:

TEACHING RESPONSIBILITIES
EE97, EE98, EE102, EE112, EE122, EE122L, EE124L, EE130, EE140, EE164, EE174, EE189, EE198A, B
EE210, EE221, EE274

EDUCATION

<table>
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<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
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<tr>
<td>Ph.D.</td>
<td>EE</td>
<td>International Technological University</td>
<td>1999</td>
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<tr>
<td>MS</td>
<td>EE</td>
<td>San José State University</td>
<td>1978</td>
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<tr>
<td>BS</td>
<td>EE</td>
<td>San José State University</td>
<td>1978</td>
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OTHER RELATED EXPERIENCE

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<tr>
<td>Lecturer Electrical Engineering, Santa Clara University</td>
<td>1989</td>
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CONSULTING AND PATENTS

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<tr>
<td>Nanocas</td>
<td>2008-2011</td>
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<td>ICfore</td>
<td>2010-2011</td>
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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

| State | Field |

HONORS, GRANTS AND AWARDS
Research grant from Stanford University Nanoscale Feb. 2007

MEMBERSHIP IN PROFESSIONAL SOCIETIES
Institute of Electrical and Electronics Engineers (IEEE) - Senior member since 2008
American Physical Society (APS)
Optical Society of America (OSA)
SPIE
Advancement of science

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

SELECTED PUBLICATIONS (last 5 years)
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Curtis A. Jones

ACADEMIC RANK
Lecturer B

DATE OF ORIGINAL APPOINTMENT
September 2003

YEARS OF SERVICE (as of Spring 2011)
8

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Lecturer B 2003 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 26
Percentage of time available for research or scholarly activities:

TEACHING RESPONSIBILITIES
EE 97: Teach lab (usually two sections each semester), and coordinate course. Revised lab manual in summer 2010.
MatE-153 lab: Teach lab (usually one section each semester). Coordinated lab before coordinator position (1 WTU) was axed.

EDUCATION
Degree Field Institution Year
Ph.D. EE Purdue 1977
MS EE Purdue 1971
BA Physics College of Wooster 1964

OTHER RELATED EXPERIENCE
Description Year
Advisory Engineer – IBM 1991-2002
Staff Engineer – IBM 1975-1991
Engineer – Arvin Magnetics 1967-1969
Engineer – Sarkes Tarzian (Magnetic Tape Division) 1964-1967

CONSULTING AND PATENTS
Description Year

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field
HONORS, GRANTS AND AWARDS

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE Magnetics Society
Sigma Xi
ACM
British APL Association

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
APL Bay Area Users’ Group (Northern CA SIGAPL of ACM) – Secretary/Treasurer
Computer History Museum – volunteer, docent
Santa Clara Valley Chapter of IEEE Magnetics Society – program committee

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
Introduction to LabView and Computer-Based Measurements Hands-On Seminar (Dec 2009)
SELECTED PUBLICATIONS (last 5 years)

“Log Log Scale for Exponential Decay”, J. Oughtred Soc., V. 19, No. 1, p. 27 (Spring 2010)

“Use Your Slide Rule as a Cheap and Cheerful Wire Table”, J. Oughtred Soc., V. 19, No. 2 (Fall 2010)
San José State University  
Electrical Engineering Department  
CURRICULUM VITAE

NAME  
Morris Jones

ACADEMIC RANK  
Lecturer A

DATE OF ORIGINAL APPOINTMENT  
August 1999

YEARS OF SERVICE (as of Spring 2011)  
12

YEAR OF ADVANCEMENT IN RANK  
Rank Year Institution and Department
Lecturer A 1999 San José State University, Electrical Engineering Department

TIME COMMITMENTS  
Percentage of time committed to the program: 40
Percentage of time available for research or scholarly activities: 20

TEACHING RESPONSIBILITIES  
EE229, EE287, also teach EE224 and EE227 as needed

EDUCATION  
Degree Field Institution Year
MS EE BYU 1977
BS EE BYU 1975

OTHER RELATED EXPERIENCE  
Description Year
Business Unit Manager Intel Corp., Santa Clara, CA 2001-2004
SR. VP and CTO Chips and Technologies, Inc., San Jose, CA 1984-1998
Mgr. CAE Seeq, San Jose, CA 1984
Principle Engineer Amdahl, Sunnyvale, CA 1978-1984
Engineer Manager Bectin-Dickinson Radio-immuno Diagnostics SLC, UT 1975-1978

CONSULTING AND PATENTS  
Description Year
Patents:
Method and apparatus for video motion compensation, reduction and color formatting 2009
Bias-level incident response system and method 2008
Method and apparatus for scalable image processing 2005
Computer system maintenance and diagnostics techniques 2003
Method and apparatus for text image stretching 2001
System for performing input and output operations to and from a processor 2000
Automatic control of gray scaling algorithms 1999
Method and apparatus for scalable image processing 1999
Memory architecture for video graphics environment 1999
Method and apparatus for managing data transfers between peripheral devices by encoding a start code in a line of data to initiate the data transfers 1999
Method and apparatus for approximated least-recently-used algorithm memory replacement 1998
Graphics controller utilizing a variable frequency clock 1998
Method and apparatus for performing run length tagging for increased bandwidth in dynamic data repetitive memory systems 1996
Two-ROM multibyte microcode address selection method and apparatus 1995
Method and apparatus for improved color to monochrome conversion 1995
− Instruction fetch circuit which allows for independent decoding and execution of instructions 1995
− Arithmetic logic unit for microprocessor with sign bit extended 1994
− Arithmetic logic unit for microprocessor with sign bit extend 1993
− Terminal control circuitry with display list processor that fetches instructions from a program memory, character codes from a display memory, and character segment bitmaps from a font memory 1990

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

HONORS, GRANTS AND AWARDS

COE Dean’s Service Award

MEMBERSHIP IN PROFESSIONAL SOCIETIES

IEEE

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)

Meeting facilitator to the College of Engineering Advisory Board
Facilitated meetings for 3 new off campus programs
Serve on the College of Engineering Resource Advisory Board

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)

SELECTED PUBLICATIONS (last 5 years)
NAME
Jalil Kamali

ACADEMIC RANK
Lecturer B

DATE OF ORIGINAL APPOINTMENT
January 2001

YEARS OF SERVICE (as of Spring 2011)
11

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Lecturer A 2001 San José State University, Electrical Engineering Department
Lecturer B 2010 San José State University, Electrical Engineering Department

TIME COMMITMENTS
Percentage of time committed to the program: 30
Percentage of time available for research or scholarly activities:

TEACHING RESPONSIBILITIES
EE132, EE210, EE250, EE251, EE97

EDUCATION
Degree Field Institution Year
PhD EE Stanford University 1996

OTHER RELATED EXPERIENCE
Description Year
Independent Telecom and Systems Engineering Consultant 2007- present
- Providing consulting services to companies worldwide in the area of telecommunication, systems modeling, and signal processing including the following projects:
  - CEI-6G-LR complete transceiver design and simulation
  - 10G Optical transceiver design, Electronic Dispersion Compensation (EDC)
  - 10G-BASE, Timing Recovery Systems, LDPC
  - Algorithm development and implementation for the dynamic line testing and management in DSL transceivers
Principal Engineer in the Department of Residential Gateway and Embedded Systems (RGES), Texas Instruments, San Jose, CA 2005-2007
- System design and specification for new technologies such as Broadband over Power Line (BPL) and Home Networking
Director of Engineering, Communications, Fremont, CA 2000-2005
- Leading the company’s standard and regulatory activities
- Defining new products and technologies
- Leading collaborating research projects with universities and research institutes
- DSL Transceiver Design and Implementation:
  - Contributed in the design and implementation of different physical layer blocks of an ADSL modem (TEQ, FEQ, Viterbi algorithm, echo canceller, crosstalk canceller, etc.)
  - System design and analysis for SHDSL, HPNA, and VDSL transceivers.
  - Study the use of turbo and LDPC code in DMT systems
  - Transmission line modeling and line probing (single-ended and double-ended), crosstalk measurement, bit rate prediction
  - Standard activities (ITU-T, TTC, T1E1) and new technologies (VDSL2)
Senior Systems Engineer in Intevac Inc., Santa Clara, CA 1998-2000
- Modeling, analysis, and design of various parts of the plasma sputtering systems which includes thermal modeling, magnetic modeling, etc.
Senior Systems Engineer in CVC, Inc., Fremont, CA 1996-1998
- Design and implementation of the temperature measurement and control system for a Rapid Thermal Processing (RTP) module.

CONSULTING AND PATENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Year</th>
</tr>
</thead>
</table>

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

HONORS, GRANTS AND AWARDS
Broadband Forum, Outstanding Contribution Award, March 2007

MEMBERSHIP IN PROFESSIONAL SOCIETIES
Senior Member of IEEE

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
President, Sharif University of Technology Association (SUTA), 2008-Present

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
  http://www.icce.org/conference_program/tutorials07.htm
- Tutorial on “Digital Subscriber Line: From Theory to Worldwide Deployment”, Department of Electrical Engineering, San José State University, October 2005

SELECTED PUBLICATIONS (last 5 years)
NAME
Ray Kwok

ACADEMIC RANK
Lecturer A

DATE OF ORIGINAL APPOINTMENT
August 2002

YEARS OF SERVICE (as of Spring 2011)
9

YEAR OF ADVANCEMENT IN RANK

<table>
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<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Lecturer A</td>
<td>2002</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
</tbody>
</table>

TIME COMMITMENTS

Percentage of time committed to the program: 20%
Percentage of time available for research or scholarly activities:

TEACHING RESPONSIBILITIES

Teaching senior level microwave engineering, electromagnetic waves in the Electrical Engineering Dept & Solid State Physics in the Physics Dept. Also working with students on various senior projects as well as Master Thesis.

EDUCATION

<table>
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<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution and Year</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>Physics</td>
<td>University of California at Los Angles 1990</td>
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<tr>
<td>MS</td>
<td>Physics</td>
<td>University of California at Los Angles 1984</td>
</tr>
<tr>
<td>BS</td>
<td>Physics</td>
<td>University of California at Los Angles 1982</td>
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OTHER RELATED EXPERIENCE

<table>
<thead>
<tr>
<th>Description</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>Part Time teaching at various colleges, including Santa Clara University</td>
<td>1992-</td>
</tr>
<tr>
<td>Sr. Principal Engineer, Alien Technology Corporation</td>
<td>2001-2005</td>
</tr>
<tr>
<td>Founder and President, ZoMatch Inc</td>
<td>1997-2003</td>
</tr>
<tr>
<td>Principal Engineer, Advanced Microwave Development, Space System/Loral</td>
<td>1997-2000</td>
</tr>
<tr>
<td>Sr. Staff Engineer, Conductus Inc</td>
<td>1996-1997</td>
</tr>
<tr>
<td>Sr. Engineering Specialist, Advanced Microwave Development, Space System/ Loral</td>
<td>1993-1996</td>
</tr>
<tr>
<td>Member of Technical Staff, Space and Communication, Hughes Aircraft Company</td>
<td>1990-1993</td>
</tr>
<tr>
<td>Research Scientist, Los Alamos National Laboratory</td>
<td>1986-1990</td>
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CONSULTING AND PATENTS

<table>
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<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>Consulting Engineer for many companies including GE Global Research at New York,</td>
<td>2005-2010</td>
</tr>
<tr>
<td><strong>Holding 2 U.S. patents and 2 international patents</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage Tunable Patch Filter Element with Dielectrically Loaded Slot</td>
<td></td>
</tr>
<tr>
<td>Single and Dual Mode Helix Loaded Cavity Filters</td>
<td></td>
</tr>
<tr>
<td>Temperature compensation technique in WiFi</td>
<td></td>
</tr>
<tr>
<td>Tunable notch in mesh network applications</td>
<td></td>
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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

<table>
<thead>
<tr>
<th>State</th>
<th>Field</th>
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</table>

HONORS, GRANTS AND AWARDS

Vice-President (Public Elected), Board of Trustees, Berryessa Union School District, San Jose (2002-2006)
Senior Member- IEEE (1997)
Space Systems/Loral Achievement Award (1995)
NRL Cooperative Research Associateship Award (1990)
Edward L. Schwartz Memorial Scholarship (1980)
**Lyle Tussing International Scholarship (1980)**

**ECC Academic Achievement Awards (1980)**

**MEMBERSHIP IN PROFESSIONAL SOCIETIES**

IEEE, Senior Member

APS (Physics Society)

**INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)**

**PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)**

Board of Trustees, Berryessa Union School District

Space Systems / LORAL,Principal Engineer

Alien Technology, RFID System Engineer

GE Global Research Laboratory, Consulting Engineer

**SELECTED PUBLICATIONS (last 5 years)**
NAME
Evan Moustakas

ACADEMIC RANK
Professor Emeritus, Lecturer C

DATE OF ORIGINAL APPOINTMENT
September 1961

YEARS OF SERVICE (as of Fall 2010)
49

YEAR OF ADVANCEMENT IN RANK

<table>
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<tr>
<th>Rank</th>
<th>Year</th>
<th>Institution and Department</th>
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<tbody>
<tr>
<td>Lecturer C</td>
<td>2007</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Professor</td>
<td>1976</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>1966</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1961</td>
<td>San José State University, Electrical Engineering Department</td>
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TIME COMMITMENTS
Percentage of time committed to the program: 10
Percentage of time available for research or scholarly activities:

TEACHING RESPONSIBILITIES
Teaching a section of EE174

EDUCATION

<table>
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<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
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<tr>
<td>Ph.D.</td>
<td>EE</td>
<td>Santa Clara University</td>
<td>1976</td>
</tr>
<tr>
<td>MS</td>
<td>EE</td>
<td>Oregon State University</td>
<td>1961</td>
</tr>
<tr>
<td>BS</td>
<td>EE</td>
<td>Oregon State University</td>
<td>1959</td>
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OTHER RELATED EXPERIENCE

<table>
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<tr>
<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>EE Dept. Chair</td>
<td>1977-1982</td>
</tr>
<tr>
<td>Adjunct Professor (part-time)</td>
<td>1972-1976</td>
</tr>
<tr>
<td>Graduate Intern, Tektronix</td>
<td>Summer 1960</td>
</tr>
<tr>
<td>Graduate Assistant</td>
<td>1959-1961</td>
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CONSULTING AND PATENTS

<table>
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<tr>
<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>Consulting, Fairchild Instrumentation</td>
<td>1966-1970</td>
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PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

<table>
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<th>State</th>
<th>Field</th>
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<tbody>
<tr>
<td>CA</td>
<td>Electrical Engineering</td>
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HONORS, GRANTS AND AWARDS
Honor Societies: Phi Eta Sigma, HKN, Sigma Tau, Tau Beta Pi, Pi Mu Epsilon, Phi Kappa Phi, Tau Beta Pi, SJSU Outstanding Engineering Faculty Award 1963

MEMBERSHIP IN PROFESSIONAL SOCIETIES
None

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
None

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
None

SELECTED PUBLICATIONS (last 5 years)

Appendix B – Faculty Vitae
San José State University  
Electrical Engineering Department  
CURRICULUM VITAE

NAME  
J. Arthur Wagner

ACADEMIC RANK  
Professor Emeritus, Lecturer C

DATE OF ORIGINAL APPOINTMENT  
August 1970

YEARS OF SERVICE (as of Spring 2011)  
41 years

YEAR OF ADVANCEMENT IN RANK

<table>
<thead>
<tr>
<th>Rank</th>
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<tbody>
<tr>
<td>Lecturer C</td>
<td>2006</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Professor</td>
<td>1977</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>1973</td>
<td>San José State University, Electrical Engineering Department</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1970</td>
<td>San José State University, Electrical Engineering Department</td>
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TIME COMMITMENTS

Percentage of time committed to the program: 20
Percentage of time available for research or scholarly activities: 10

TEACHING RESPONSIBILITIES

EDUCATION

<table>
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<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Year</th>
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<tr>
<td>Ph.D.</td>
<td>EE</td>
<td>Oregon State University</td>
<td>1970</td>
</tr>
<tr>
<td>MS</td>
<td>EE</td>
<td>University of Arizona</td>
<td>1963</td>
</tr>
<tr>
<td>BS</td>
<td>EE</td>
<td>Santa Clara University</td>
<td>1961</td>
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OTHER RELATED EXPERIENCE

<table>
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<tr>
<th>Description</th>
<th>Year</th>
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<tbody>
<tr>
<td>Experienced Electrical Engineer in Electromagnetics, Electromechanics, and Motor Control. Expertise in engineering design, analysis, simulation, and hands-on testing. Strong background in electromagnetics, motors, control, and power electronics developed through staff and consulting positions in start-ups through large firms. Ability to discover new and patentable designs. Solution-oriented with an eye toward improved products and reduced costs.</td>
<td>1983-2011</td>
</tr>
</tbody>
</table>

CONSULTING AND PATENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Year</th>
</tr>
</thead>
</table>
| Consultant to the disk drive industry  
  - Design of circuits, compensators, magnets, and motors,  
  - Support HDA electrical hardware  
  - Short courses on motor design from the electrical and magnetics side  
| 1983-2007 |
| Worked with law firms over a period of 20 years on patent searches, disclosures, declarations, depositions, and so forth. | 1983-2005 |

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION

<table>
<thead>
<tr>
<th>State</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
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</tbody>
</table>

HONORS, GRANTS AND AWARDS

- Honorary fraternities  
  - Tau Beta Pi (Engineering)  
  - Eta Kappa Nu (Electrical Engineering)  
  - Phi Kappa Phi (Academic Excellence)
MEMBERSHIP IN PROFESSIONAL SOCIETIES
• IEEE
  o Life Member
  o Societies
    ▪ Magnetics Society
    ▪ Industrial Applications Society
    ▪ Control Systems Society (Technology)

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
• IEEE
  o Local Chairman of an IAS conference in San Jose, CA, ECCE2009
  o Occasional Session Chair at IAS Annual Conferences.
  o Critically review submitted papers at IAS conferences

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
• Affiliations
  o IDEMA (disk drive association)
  o Alumni Board Member at Santa Clara University

SELECTED PUBLICATIONS (last 5 years)
No publications in the last 5 years.
San José State University
Electrical Engineering Department
CURRICULUM VITAE

NAME
Zoroofchi, Mohammad Javad

ACADEMIC RANK
Lecturer C

DATE OF ORIGINAL APPOINTMENT
January 1997

YEARS OF SERVICE (as of Spring 2011)
24

YEAR OF ADVANCEMENT IN RANK
Rank Year Institution and Department
Lecturer C 1997 San José State University, Department of Electrical Engineering

TIME COMMITMENTS
Percentage of time committed to the program: 60
Percentage of time available for research or scholarly activities: 20

TEACHING RESPONSIBILITIES
I have taught courses in the following areas:
1. Circuit Analysis, EE 98, EE110, EE 97 Lab
2. Electronics, EE 122, EE124, EE223, EE122 Lab
3. Semiconductor Devices, EE 128, EE221

EDUCATION
Degree Field Institution Year
Ph.D. EE Southern Methodist University 1974
MS EE University of Oklahoma 1968
BS EE University of Oklahoma 1966

OTHER RELATED EXPERIENCE
Description Year
None

CONSULTING AND PATENTS
Description Year
None

PROFESSIONAL REGISTRATION, LICENSING AND CERTIFICATION
State Field

HONORS, GRANTS AND AWARDS
Outstanding Lecturer Award, College of Engineering, SJSU, 2011

MEMBERSHIP IN PROFESSIONAL SOCIETIES
IEEE

INSTITUTIONAL AND PROFESSIONAL SERVICE (last 5 years)
San José State University, Department of Electrical Engineering

PROFESSIONAL ACTIVITIES, DEVELOPMENT AND AFFILIATIONS (last 5 years)
None

SELECTED PUBLICATIONS (last 5 years)
None
Appendix C: Equipment
Below is the list of department laboratories and descriptions of each laboratory, including equipment and supported courses

- **Biomedical Instrumentation:** ENGR 305
- **Circuits:** ENGR 249
- **Communications:** ENGR 238
- **Digital Design:** ENGR 244, ENGR 307, ENGR 389
- **Digital Signal Processing:** ENGR 386
- **Electronic Design:** ENGR 290, ENGR 258
- **Integrated Circuits Design:** ENGR 289, ENGR 291
- **Mixed-Signal Design and Test:** ENGR 321
- **Networking:** ENGR 490
- **RF Integrated Circuits Design:** ENGR 319
- **Open Lab:** ENGR 387
- **Research Labs:** ENGR 295, ENGR 317
- **Senior Design Lab:** ENGR 376
- **Graduate Project Lab:** ENGR 347

**Biomedical Instrumentation Laboratory (ENGR 305)**
The Biomedical Instrumentation Lab is a brand new facility that houses a variety of biomedical equipment for testing and creation of biomedical electronics and systems. The lab consists of 8 Grass Technologies biomedical function generators, 4 Clevedem biosignal acquisition units, 1 BIOPAC demo unit, 4 Agilent nano-volt multimeters, 8 Agilent oscilloscopes, 8 Agilent function generators, 8 multimeters, and 8 Dell quad-core computers with PSPICE and the latest MATLAB installed. Students build biomedical electronics circuits like EMG, ECG, pulse oximeter, glucose sensors, etc. and test, measure and process responses.

- Courses: EE127 - Electronics for Bioengineering Applications, EE261 - Biomedical Imaging, EE262 – Biosignals
- Laboratory Director: Prof. Keralapura
- Sponsor: Electrical Engineering Department

**Circuits Laboratory (ENGR249)**
This introductory lab provides 16 stations with the basic electronic measuring instruments with which every electrical engineer should be proficient. Each station, normally shared by two students, has an HP-972A digital multimeter, an Tektronix DPO3012 oscilloscope, an HP-33120A function generator and an HP-3631A triple-output power supply. The lab allows students to practice building simple circuits, measuring and understanding them, and reporting their findings.

- Courses: EE97 - Introductory Electrical Engineering Laboratory
- Laboratory Director: Prof. Hsu
- Sponsor: Electrical Engineering Department

**Communications Laboratory (ENGR238)**
This lab has four stations each equipped with an Agilent DSO7032A oscilloscope, a Tektronix TAS465 oscilloscope, two Agilent 33220A waveform generators, a Tektronix CFG280 function generator, a HP8591E spectrum analyzer, a HP6236B power supply, and a Agilent 34405A multimeter. Also, each station has a PC equipped with the latest Matlab version for the purpose
of development and simulation of communication systems. The lab E238 also hosts the Wireless Communication lab which uses 8 USRP Motherboards with antennas and accessories and 12 Dell Vostro3500 laptops. To support the lab there is an extra bench equipped with an Agilent DSO7034B oscilloscope, an Agilent N9010-503 EXA Signal Analyzer, and an N9310A RF signal generator.

- Laboratory Directors: Prof. Morelos-Zaragoza and Prof. Birsen Sirkeci
- Sponsor: Electrical Engineering Department

**Digital Systems Interfacing Laboratory (ENGR244)**

This lab provides equipment and tools for students to practice the design and implementation of system interfacing circuits with standard communication protocols and specifications. The lab is set up for experiments and projects dealing with topics such as system hardware and software interfaces, arbitration techniques, serial and parallel interfaces, A/D and D/A, and I/O interfaces.

- Courses: EE177 - Digital Systems Interfacing, EE130 - Electromechanics, EE138 - Introduction to Embedded Control System Design, EE198 – Senior Design Project, EE297 - MSEE Degree Project
- Laboratory Director: Prof. Le
- Sponsor: Electrical Engineering Department

**Microprocessors Laboratory (ENGR307)**

This lab provides equipment and tools for students to explore the microprocessor architecture by writing, debugging and running simple assembly language programs. The programs provide students with hands-on experience in topics such as addressing mode, instruction set, memory and array manipulation, interrupts, and simple input/output operations. The lab also provides equipment and tools for students to practice the design and implementation of simple microprocessor-based system control and interface, as well as the use of digital logic analyzer for digital circuit design and testing.

- Courses: EE120 – Microprocessor-based System Design
- Laboratory Director: Prof. Le
- Sponsor: Electrical Engineering Department

**Digital Systems Design & Embedded Systems Laboratory (ENGR389)**

This lab is used to conduct practical lab for the undergraduate courses as well as for graduate MSEE projects. This lab is supported by Xilinx. It has 18 Dell computers with Xilinx ISE Student Edition 8.1i and ModelSim software, all aimed to provide students with logical and electrical basis for Digital System Design. Students will not only develop programmable logic for MUXs, DEMUXs, Flip-flops, decoders and encoders but will also learn about FPGA devices, synthesis & simulation tools. Also, it provides HDL-based facility for design, verification, and implementation of architectures, algorithms and embedded FPGA systems. In addition to these equipment it has 12 Dell computers equipped with Xilinx, Altera, ModelSim and Synopsys development software packages. For real-time testing of target systems the Lab uses Spartan 3E and Virtex II Pro boards to support advance digital systems designs.
- Laboratory Director: Prof. Choo
- Sponsor: Xilinx

DSP/FPGA Laboratory (ENGR386)
This lab has been developed with equipment grants from Texas Instruments, Altera, and Intel. This lab provides PC-based DSP/FPGA co-development workstations for developing and implementing various DSP/Communications /Video/Imaging algorithms and systems. Computers are also equipped with Altera Quartus 2, TI’s Code Composer Studio, MATLAB, Microsoft’s Visual Studio 6, Altera DE-2 FPGA Boards, ADC/DAC and camera/LCD daughter cards and TI C5416 DSP board. The lab is currently used to support graduate courses and MS projects involving DSP/communications/video/imaging algorithm research, development and implementation using DSP processors and FPGA chips.
- Courses: EE256 - Programmable DSP Architecture and Applications, EE278 - Digital Design for DSP/Communications, EE297 - MSEE Degree Project
- Laboratory Director: Prof. Singh
- Sponsors: Altera and Texas Instruments

Electronic Design I Laboratory (ENGR290)
This lab is used to support the electronic design course. The equipment in the laboratory consist of oscilloscopes, function generators, frequency counters, digital multimeters, power supplies, capacitor meters, and curve-tracers. There are computer stations equipped with PSpice software in the laboratory. Students do PSpice simulations on the experiments. The experiments performed by students in this laboratory are onlinear and nonlinear applications of op amps, the applications of diodes, and MOS & BJT amplifiers.
- Courses: EE122 - Electronic Design I
- Laboratory Director: Prof. Parent
- Sponsor: Electrical Engineering Department

Electronic Design II Laboratory (ENGR258)
This lab has state of the art electronic instruments like the latest Agilent Oscilloscopes, Function Generators, Power Supplies, Digital Multimeters, Capacitance Meters and the latest Dell Desktops. Also it has one ELVIS (Educational LabView Instrument System) Demo Station. High tech software like LabView & PSpice are used as design aid for the development and measurement of basic analog bipolar and CMOS IC circuits. Working in this lab students get hands-on experience in the design and verification of simple building blocks of IC amplifiers, transconductance and operational amplifiers, their frequency response and their use in feedback circuits.
- Courses: EE124 - Electronic Design II
- Laboratory Director: Prof. Hamedi-Hagh
- Sponsor: Electrical Engineering Department

Charles Babbage Process Integration Laboratory (ENGR289)
This lab has been developed with equipment from Synopsys. This lab provides Linux workstations with Electronic Design Automation software tools from Synopsys for TCAD (semiconductor device and process design), as well as HDL software for circuit synthesis. Computers in the lab are currently used to support EE courses, Senior Design Projects, and MS projects/theses involving process integration.

- Laboratory Director: Prof. Parent
- Sponsor: Synopsys

IC Design Laboratory (ENGR291)
This lab has been developed with equipment and curriculum grants from Intel and Cadence Design systems. This lab provides Linux workstations with Electronic Design Automation software tools from Cadence Design Systems and Synopsys for full custom analog and digital IC design, as well as HDL software for circuit synthesis. (Including a physical library for place and route.) Computers are currently used to support EE courses, Senior Design Projects, and MS projects/theses involving circuit design.

- Laboratory Director: Prof. Parent
- Sponsor: Cadence

Mixed-Signal Test Laboratory (ENGR321)
This lab has been developed with equipment grants from Agilent and National Semiconductor. This lab provides facility for testing mixed signal integrated circuits. The lab has signal generators, scopes, meters and other equipment used for analog and mixed signal IC testing.

- Courses: EE182 - Electronics Test Design Engineering I, EE183 - Electronics Test Design Engineering II, EE189 - Special Topics in Electrical Engineering, EE198 - Senior Design Project, EE297 - MSEE Degree Project
- Laboratory Director: Prof. Ardalan
- Sponsor: Agilent Technologies

Networking Laboratory (ENGR 490)
This Cisco Networking Lab offers high end Cisco routers and switches which enable students to gain hands on experience on networking devices. Most of the routers in the lab support ISDN, ATM, Token Ring & FDDI network architectures. This lab is used for Electrical Engineering courses along with course from other departments such as Business, Computer Engineering, and Computer Science. The lab is located in Room E490 on the 4th floor of Engineering Building and hosts the following Cisco equipment: Cisco 1900, Cisco 2912 & Cisco 4003 switches, Cisco 2514, Cisco 2524, Cisco 3640, Cisco 4000, Cisco 4500 & Cisco 7000 routers, and Cisco 2511 Commervers.

- Courses: EE181 - Fundamentals of Internetworking, EE281 - Internetworking
- Laboratory Director: Prof. Rejeb
- Sponsor: Cisco
RF Integrated Circuits Laboratory (ENGR319)
The RFIC lab is developed for research purposes and serves MSEE Degree Project. This lab support students affiliated with the lab work on advanced IC design research topics for various wireless communication systems. Equipment in this lab includes Probe Station, Network Analyzer, Spectrum Analyzer, Signal Generator, Noise Figure Analyzer, Semiconductor Device Analyzer and Waveform Generator. The computer facilities include UNIX SUN server and workstations to manage CAD tools and Process Design Kits as well as a Windows PC stations. The lab has close ties with prominent companies in Silicon Valley.

- Courses: EE297 - MSEE Degree Project
- Laboratory Director: Prof. Hamedi-Hagh
- Sponsor: Atmel

Open Laboratory (RNGE387)
This lab provides PC stations to support students with their studies and homeworks for graduate and undergraduate courses. The computers have design software, such as MATLAB, ADS, Microwave Office, Altera, Orcad. Also they are equipped with internet access to Cadence and Synopsis tools and a printing facility. This lab is open Monday to Saturday from 6:30 AM to 10:30 PM.

- Laboratory Director: Prof. Singh
- Sponsor: Electrical Engineering Department

Research Lab - Digital Signal and Data Processing Laboratory (ENGR295)
This lab is a Special Research Lab which is used to conduct research for NASA’s Cassini project. It houses professional equipment necessary to perform research and graduate projects.

- Courses: EE299 - Masters Thesis
- Laboratory Director: Prof. Marouf
- Sponsor: NASA

Research Lab - Semiconductor-Biomedical Interface Laboratory (ENGR317)
This lab is equipped with a Linux server with the Cadence full custom IC design software (with NCSU kit), Synopsys semiconductor process design software (TCAD), Matlab, and ORCAD. This lab has high speed logic analyzers, oscilloscopes, function generators impedance analyzers. We have a Terason portable ultrasound scanner with Cone Instruments scanning phantoms, hydrophones with a scanning tank, a variety of single element transducers, an Olympus pulser, an Arbitrary waveform generator, a 300MHz Agilent oscilloscope, a Nikon microscope, a power amplifier (ENI Technologies), a radiation force balance and other ultrasound measurement accessories. The student working in their senior projects get expertise in silicon neuron modeling and bio interfacing. In addition to the mentioned equipment, we have a whole range of equipment to teach and research Ultrasound technologies for biomedical applications.

- Courses: EE297 / EE299 - MSEE Degree Project / Thesis
- Laboratory Director: Prof. Keralapura
- Sponsor: Electrical Engineering Department
Senior Design Laboratory (ENGR376)
This lab has been developed to support senior design projects for undergraduate students. This lab provides instrumentation consisting of oscilloscopes, signal generators, meters, personal computers etc. for developing and implementing hardware and software for the projects. The lab also provides separate facility for lectures and presentations.

- Courses: EE198 - Senior Design Project
- Laboratory Director: Prof. Chen
- Sponsor: Electrical Engineering Department

MS Project Laboratory (ENGR347)
This lab has been developed to provide a venue to support graduate projects. There are cabins assigned to faculty advisors which can be used to house development stations and provide a place for graduate students to work on their projects. The equipment in these cabins varies depending upon the projects being done at a given time. This lab also provides facility for project presentations and meetings for the project groups.

- Courses: EE297 - MSEE Degree Project, EE299 - Master’s Thesis
- Laboratory Director: Prof. Chen
- Sponsor: Electrical Engineering Department
Appendix D: Institutional Summary

Appendix D1: The Institution
Appendix D2: Type of Control
Appendix D3: Educational Unit
Appendix D4: Academic Support Units
Appendix D5: Non-Academic Support Units
Appendix D6: Credit Unit
Appendix D7: Tables of Program Enrollment, Degree Data, Personnel
D1. The Institution

Institution Name and Address: San José State University
One Washington Square
San Jose, California 95192

Chief Executive Officer: Don Kassing, Interim President

Person Submitting Self-Study Report: Dr. Ray Chen, Chair
Electrical Engineering Department
Charles W. Davidson College of Engineering

San José State University is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC). It received its initial accreditation in 1962, and its most recent accreditation in 2007.

D2. Type of Control

The public higher education system in the State of California is comprised of three systems: the University of California, the California State University (CSU), and California Community Colleges. San José State University (SJSU) is one of the 23 campuses of the CSU system, and is the oldest public higher education institution on the west coast.

Responsibilities for the California State University system are vested in the Board of Trustees, consisting of ex-officio members; alumni and faculty representatives; and members appointed by the Governor. The trustees appoint the Chancellor of the University system. The President of San José State University is the chief executive officer of the campus, and reports to the Chancellor.

D3. Educational Unit

The Electrical Engineering program is housed with the Electrical Engineering Department within the College of Engineering. The program is overseen by the Department Chair, Dr. Ray Chen. The Chair has administrative and budgetary responsibility for the programs in the department, and reports directly to the Dean of the College, Dr. Belle Wei. The Dean in turn reports to the Vice President for Academic Affairs (Provost) Dr. Gerry Selter. The Provost reports to the president of the University, Mr. Don Kassing (with Dr. Mohammad Qayoumi scheduled to begin as President on July 1, 2011).

The hierarchical academic structure from the institution Chief Executive Officer to the Electrical Engineering Department Chair is described by organization structure charts shown in Figures D3.1 through D3.3 below. Figure D3.4 shows structure of Engineering Student Success Center, the major advising center for engineering students.
Figure D3.1: Institutional Academic Structure (President to Provost)

Figure D3.2: Institutional Academic Structure (from Provost to College Dean)
Figure D3.3: College of Engineering Academic Structure (from Dean to Department Chair)
The Electrical Engineering program is located within the Charles W. Davidson College of Engineering, which is one of the eight Colleges comprising San Jose State University. The Colleges are:

- College of Applied Sciences and Arts
- College of Business
- College of Education
- College of Engineering
- College of Humanities and The Arts
- College of Science
- College of Social Sciences
- International and Extended Studies.

The College Deans report to the Provost and Vice-President for Academic Affairs, Dr. Gerry Selter.

There were 2,745 undergraduates and 1,772 graduate students enrolled in the College of Engineering in Fall 2010, which comprises about 15% of the total university enrollment. There were 82 tenure-track (including faculty members on the Faculty Early Retirement Program (FERP)), three full-time temporary and 99 part-time faculty members in Fall 2010. The College
is organized administratively into six engineering departments, one non-engineering department (Aviation and Technology), and one non-accredited engineering program, General Engineering, which reports to the Associate Dean for Graduate and Extended Studies (ADGES). The Departments are:

- Chemical and Materials Engineering, Chair: Dr. Gregory Young
- Civil and Environmental Engineering, Chair: Dr. Udeme Ndon
- Computer Engineering, Chair: Dr. Sigurd Meldal
- Electrical Engineering, Chair: Dr. Ray Chen
- Industrial and Systems Engineering, Chair: Dr. Yasser Dessouky
- Mechanical and Aerospace Engineering, Interim Chair: Dr. Richard Desautel
- Aviation and Technology, Chair: Dr. Seth Bates

The six engineering department chairs manage the following nine engineering programs:

- Aerospace Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Industrial and Systems Engineering
- Materials Engineering
- Mechanical Engineering
- Software Engineering (jointly with Computer Science and administered by Undergraduate Studies).

The General Engineering Program serves as an incubator for new engineering concentrations. It also serves entering engineering students who are undecided about their majors. General Engineering is not an ABET accredited program.

Department Chairs report to the Dean of Engineering. The Office of the Dean is organized as follows:

- Dean: Dr. Belle Wei
- Associate Dean: Dr. Emily Allen
- Associate Dean for Graduate and Extended Studies: Dr. Ahmed Hambaba

D4. Academic Support Units

All Engineering majors require some courses in math, physics, chemistry, and general (common) engineering. Electrical Engineering program also requires some courses taught by Computer Engineering Department and the Chemical and Material Engineering Department. The Chairs of each department teaching required courses are listed below.

- Dr. Bradley Stone, Chair of Chemistry Department
- Dr. Bradley Jackson, Chair of Mathematics Department
General Education courses are taught by a wide variety of departments across the campus. The Deans of the relevant Colleges are listed here:

- Dr. Karl Toepfer, Dean, College of Humanities and the Arts
- Dr. Sheila Bienenfeld, Dean, College of Social Sciences
- Dr. Michael Parrish, Dean, College of Science
- Dr. Charles Bullock, Dean, College of Applied Arts and Sciences
- Dr. David Steele, Dean, College of Business

D5. Non-academic Support Units

Non-academic support units included units within the college of engineering and units outside the college of engineering. The units within the college of engineering include the Engineering Student Success Center (ESSC), the Mathematics, Engineering, and Science Achievement Engineering Program (MEP), the Engineering Computing System (ECS), and the Central Shop. The names and titles of the individuals responsible for each of these units are listed as below:

- (Vacant position), Executive Director, Engineering Student Success Center
- (Vacant position), Assistant Director for Advising, Engineering Student Success Center
- Linda Ortega, Assistant Director for Student Support, Mathematics, Engineering, and Science Achievement Engineering Program (MEP)
- Kindness Israel, Director, Engineering Computing Services (ECS)
- Craig Stauffer, Head Machinist, Central Shop

There are also many campus units that support the instructional and operational needs of the college of engineering. Among them, the units that provide the most critical supports to the College of Engineering and Electrical Engineering Department are the Learning Assistance Resource Center (www.sjsu.edu/larc), the Writing Center (www.sjsu.edu/writingcenter/), the Academic Advising and Retention Services (www.sjsu.edu/aars), the University Library (Dr. Martin Luther King, Jr. Library, http://library.sjsu.edu/), the University Technology Services (http://uts.sjsu.edu/), the Career Center (www.careercenter.sjsu.edu/), the Disability Resource Center (www.drc.sjsu.edu), the Educational Opportunity Program (www.sjsu.edu/eop/), and the Counseling Services (www.sjsu.edu/counseling/). The names and titles of the individuals responsible for each of these units are listed as below:

- Alice Ting, Director of Learning Assistance Resource Center
- Dr. Linda C. Mitchell, Director, Writing Center
- Cindy Kato, Director of Academic Advising and Retention Services
- Linda Harvel, Academic Advisor for Engineering Students, Academic Advising and Retention Services
- Dr. Mengxiong Liu, Librarian, Martin Luther King, Jr. Library
D6. Credit Unit

One semester unit represents one class hour (50 minutes) or three laboratory hours per week. One academic year represents 30 weeks of classes, exclusive of final examinations.

D7. Tables

Table D1 on page 157 shows the enrollment and degree data of Electrical Engineering department in the past 5 years (2006 through 2010 academic year). Table D2 on the page 158 shows personnel data of Electrical Engineering department for the fall 2010 semester. Updated data for fall 2011 semester will be provided at the time of the visit.
### Table D1. Program Enrollment and Degree Data

#### Electrical Engineering

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Enrollment Year</th>
<th>Total Undergrad</th>
<th>Total Grad</th>
<th>Degrees Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F10 FT</td>
<td>62/36/61/152/1</td>
<td>312</td>
<td>272</td>
<td>0/40/101/0</td>
</tr>
<tr>
<td></td>
<td>3/3/19/53/6</td>
<td>84</td>
<td>197</td>
<td></td>
</tr>
<tr>
<td>F09 FT</td>
<td>79/42/74/171/2</td>
<td>368</td>
<td>315</td>
<td>0/95/213/0</td>
</tr>
<tr>
<td></td>
<td>4/4/28/60/6</td>
<td>102</td>
<td>245</td>
<td></td>
</tr>
<tr>
<td>F08 FT</td>
<td>100/27/95/177/5</td>
<td>404</td>
<td>358</td>
<td>0/100/211/0</td>
</tr>
<tr>
<td></td>
<td>7/4/31/66/5</td>
<td>113</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>F07 FT</td>
<td>65/27/94/205/4</td>
<td>395</td>
<td>346</td>
<td>0/160/180/0</td>
</tr>
<tr>
<td></td>
<td>11/5/35/96/11</td>
<td>158</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>F06 FT</td>
<td>68/36/87/264/9</td>
<td>464</td>
<td>229</td>
<td>0/106/135/0</td>
</tr>
<tr>
<td></td>
<td>12/3/33/87/11</td>
<td>146</td>
<td>155</td>
<td></td>
</tr>
</tbody>
</table>

Give official fall term enrollment figures (head count) for the current and preceding four academic years and undergraduate and graduate degrees conferred during each of those years. The "current" year means the academic year preceding the fall visit.

FT--full time

PT--part time
### Table D2. Personnel

**Electrical Engineering**

**Year**: Fall 2010

<table>
<thead>
<tr>
<th>Position</th>
<th>FT</th>
<th>PT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Faculty (Tenured/Probationary)</td>
<td>15</td>
<td>14.27</td>
</tr>
<tr>
<td>Other Faculty (Lecturers)</td>
<td>9</td>
<td>3.65</td>
</tr>
<tr>
<td>Student Teaching Assistants (Teaching Associate)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>5</td>
<td>0.65</td>
</tr>
<tr>
<td>Instructional Student Assistants (ISA)&lt;sup&gt;5&lt;/sup&gt;</td>
<td>22</td>
<td>10.55</td>
</tr>
<tr>
<td>Student Assistant (SA)&lt;sup&gt;6&lt;/sup&gt;</td>
<td>6</td>
<td>2.88</td>
</tr>
<tr>
<td>Student Research Assistants</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Technicians/Specialists</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Office/Clerical Employees</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

1. Data on this table should be for the fall term immediately preceding the visit. Updated tables for the fall term when the ABET team is visiting are to be prepared and presented to the team when they arrive.

2. For student teaching assistants, 1 FTE equals 20 hours per week of work (or service). For undergraduate and graduate students, 1 FTE equals 15 semester credit-hours (or 24 quarter credit-hours) per term of institutional course work, meaning all courses — science, humanities and social sciences, etc. For faculty members, 1 FTE equals what your institution defines as a full-time load.

3. Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category.

4. Teaching Associates perform duties that primarily involve classroom and laboratory instruction. Responsibility for a course may be vested in the Teaching Associate under the direct supervision of an appropriate faculty member.

5. Instructional Student Assistants perform duties such as tutoring, grading and/or minor teaching.

6. Student Assistants perform duties such as clerical, technical, custodial, laborer and/or other work as assigned.