I. ANNUAL REPORT FOR YEARS 2006 - 2007

Mission Statement
The mission of the Computer Engineering at the University of South Carolina (USC) is to provide students with opportunities for acquiring a broad foundation of computer science and engineering knowledge, an in-depth research experience at the frontiers of computer science and engineering, and skills for life-long learning and professional development.

Goal 1.
Computer Engineering Master of Science graduates are expected to gain the required knowledge of theory and research in the core areas of engineering.

Curriculum.
CE 513 (Computer Architecture), 531 (Compiler Construction), 575 (Robotics), 750 (Analysis of Algorithms).

Learning Outcome 1.
Students will describe the techniques and principles for the development of high performance computer systems.

Criteria
- Students will write a final report in CE 531 describing and explaining the details of extant computer architectures. All students should receive a score of 3 (out of 5) or higher when evaluated with the assignment’s rubric.
- This learning outcome also will be measured by embedding specific questions on the final exams in CE 513, 531, and 750. At least 90% of students will correctly answer all embedded questions.

Methods
- Faculty teaching CE 531 will submit final, ungraded reports to the program director. The program director will make a copy of the papers and return the original copy to the appropriate faculty. The program director will make sure to remove any student identifying information (e.g., name, SSN) from the copy. The program director will compile a representative sample of these papers to be distributed to the faculty for evaluation using the appropriate rubric. The faculty members will meet with the purpose of identifying students’ strengths and weaknesses and this assessment strategy. Where weaknesses are identified, recommendations will be developed and given to the entire faculty at the departmental meeting at the end of the spring semester.
- At the end of the semester, all faculty members who administered exams with embedded exam questions will submit this information to the department’s program director. The program director will upload this information into a database. The program director will aggregate and analyze the data, and submit a report to the department chair. Results will be shared and discussed with the department faculty as a whole at the end of the spring semester. Appropriate recommendations for the program change will be made and recorded in the program faculty minutes.

Results
- All students (N=25) received a 3 (out of 5) or higher on their final reports, when evaluated with the assignment’s rubric. Overall, students excelled in explaining Instruction Set Architecture (ISA) and microarchitecture.
- The results indicate that 92% of (23 out of 25) CE 531 students answered all embedded exam questions correctly, with one exception. Students did not demonstrate a satisfactory understanding of lexical analysis, with 60% of (15 of 25) students answering exam questions on this topic correctly.

Use of Results
- No change is suggested at this time.
Traditionally this is the last topic to be covered in 531 and this semester time just ran out before it could be sufficiently covered. It was noted that time pressures should not allow the topic of lexical analysis to be missed in CE 531. In the future less coverage of syntax-directed translation would be acceptable to ensure that there is sufficient time for good coverage of lexical analysis and related topics. We will also insist that there be a question on the exam that allows for evaluation of this topic.

Goal 2.
Computer Engineering Master of Science graduates will be able to conduct and disseminate research that advances the state of knowledge in the field of inquiry.

Curriculum.
CE 511 (Research Methods), 799 (Thesis Preparation).

Learning Outcome 1.
Students will be able to identify pertinent research problems, and formulate a research plan.

Criteria
- Final research proposal paper submitted in CE 511. Faculty will use the following scale: (1) Exceeds expectations with regards to quality of research question, (2) Meets expectations, or (3) Does not meet expectations. Graduate students demonstrate an adequate level of comprehension of framing research questions and formulating a research plan when at least 90% of students in CE 511 receive a rating of “meets expectations” or “exceeds expectations” by faculty members.
- Thesis proposal. Students ability to identify a research question and develop a research plan is rated by faculty on a scale of 0-3, where 0 = fail, 1 = borderline pass, 2= pass, and 3 = honors pass. Ninety percent of students should achieve a score of 2 or above on each of these dimensions.

Methods
- At the end of the semester, all faculty members who taught CE 511 will submit the ungraded final research papers to the program director. The program director will make a copy of the papers and return the original copy to the appropriate faculty. The program director will make sure to remove any student identifying information (e.g., name, SSN) from the copy. The program director will compile a representative sample of these papers to be distributed to the faculty for evaluation using the appropriate rubric. Faculty members will score the papers with the rubric. Scorred rubrics will be returned to the program director for data analysis. The faculty members who taught CE 511 will then meet to discuss overall strengths and weaknesses of the students’ papers. These results will be disseminated to the entire faculty at the end-of-the-semester departmental meeting.
- The student’s thesis committee chair collects the data and submits it to the Computer and Science and Engineering program director. The program director compiles and analyzes the data from all students who proposed a thesis during that year. The program director reports the data to the faculty and the department chair at a faculty meeting just after the conclusion of the spring semester.

Results
- The results indicate that 91% of (30 out of 33) CE 511 students met or exceeded expectations by developing an adequate research question in their final research paper. Although students excelled in framing research questions, several students had difficulty in transitioning the research question into a feasible study.
- Eight students proposed their thesis during this academic year. Eighty-eight percent of students (7 out of 8) received a score of 2 or higher on this dimension.

Use of Results
- Additional class time, in CE 511, will be devoted to research design and planning. Students will be given the opportunity to break up into groups in order to evaluate each other’s research plans and receive feedback.
- The numerical ratings did not provide enough information to the committee to guide any reforms. Next year, at the time of each student’s thesis defense, committee members will also be required to note where the weaknesses were in those students with lower ratings. This will make it much easier when they go back to address why a particular set of scores was so low.

Learning Outcome 2.
Students will be able to generate and analyze original research results, and to communicate these results.

Criteria
- This research ability is also assessed through the thesis defense. Students ability to generate and analyze original research results, and to communicate these results in writing is rated by faculty on a scale of 0-3, where 0 = fail, 1 = borderline pass, 2= pass, and 3 = honors pass. All students should pass the thesis defense with a score of 2 or above on each of these dimensions.
The number of papers authored/co-authored and the number of conference presentations given by graduate students is an indicator of research ability. The program director recommends that each student submit at least one manuscript for outside peer review, leading to reputable journals, and/or present research findings at conference proceedings. Acceptance of the manuscripts for publication is not required for graduation. Ninety percent of students should submit at least one manuscript for submission to a refereed archival journal, and/or present research at a conference.

Methods

- Members of the thesis defense committee will rate the student's ability to generate, analyze original research results, and to communicate these results on the aforementioned scale. In the case that a rater determines that a student is unsatisfactory or marginal in any dimension, the rater will provide narrative explanation of the nature and area of the deficiency. The scoring (and possible annotation thereof) of each student by each rater will be turned into the program director who will collapse the scores across students and raters. The program director will also collate and summarize any noted areas of deficiency. At the first program meeting of each academic year, the score will be reviewed by the program as a whole and potential problem areas in the training of our students will be identified. If problem areas are identified, the curriculum committee will develop curriculum changes that can remedy the problem.
- Students’ major professors keep track of this information. Students’ major professors send notice to the program director when a manuscript is submitted and when one is accepted. The program director then enters this information into a database. At the end of the academic year, the program director aggregates the data and analyzes it. The summary of results is then given to the department chair, who is responsible for sharing and discussing this at the departmental meeting at the conclusion of the spring semester.

Results

- Five students defended their thesis during this academic year. All students received a score of 2 or higher on each of these dimensions.
- The following data are based on the activities of 15 graduate students. There were 24 presentations (1.6 presentations/student) and 9 journal publications (0.6 publications per student) by our graduate students during the academic year of 2006-2007. Ninety-five percent of students submitted a manuscript for publication and/or presented their work at conference proceedings. In addition, there were two first place awards for oral presentations at the USC Graduate Student Day, five travel awards from either federal agencies or national organizations, two travel awards from the College of Arts and Scientists, and four Fellowships awarded from the Graduate School of USC.

Use of Results

- No change is suggested at this time.
- The department will continue to encourage students to publish and present their work.

Goal 3.
All graduates will be competitive candidates for professional careers and/or Ph.D. study.

Curriculum.
All aspects of the curriculum contribute to this goal and are evaluated with respect to their success in contributing to the first two goals. In addition, students meet with their advisors to discuss placement issues and attend job talks within the department.

Learning Outcome 1.
Within two years of graduation with their MS degree, students will be engaged in professional careers and/or Ph.D. study.

Criteria

- Seventy percent of all students completing their MS degree will enter a doctoral program or obtain employment in a related field within two years of graduation.
- In Alumni Surveys, 85% of students surveyed will report each course as "beneficial" or "very beneficial" in (a) understanding an important area of computer science and engineering, and (b) being able to completely discuss engineering topics.

Methods

- All graduates will be contacted 2 years after their graduation date by the program director to determine:
  - where each is employed or in graduate school,
  - the extent to which they were satisfied with their experience in the MS program, and
  - the extent to which they were prepared by the MS program.
Results

- Post-graduate employment information exists for 19 MS graduates following 2003. Sixty-eight percent of graduates (13 out of 19) entered graduate programs or obtained employment in a related field within two years of graduation.
- On Alumni Surveys, 96.2% of students either agreed or strongly agreed that their courses gave them an understanding of important areas of computer science and engineering. (b) 95.4% of students either agreed or strongly agreed that their courses allowed them to be able to competently discuss engineering topics.

Use of Results

- The criteria was not achieved in that 68% (not 70%) entered graduate school or obtained employment. Given that the results were close to our target, we will monitor this closely and try to improve our response rate for the survey by offering a paper and a web-based survey for convenience.
- No change is suggested at this time.

II. FUTURE ASSESSMENT PLAN FOR YEARS 2007 - 2008

Mission Statement

The mission of the faculty members of the College of Engineering and Computing at the University of South Carolina (USC) is to provide students with opportunities for acquiring a broad foundation of computer science and engineering knowledge, an in-depth research experience at the frontiers of computer science and engineering, and skills for life-long learning and professional development.

Goal 1.
Computer Engineering Master of Science graduates are expected to gain the required knowledge of theory and research in the core areas of engineering.

Curriculum.
CE 513 (Computer Architecture), 531 (Compiler Construction), 575 (Robotics), 750 (Analysis of Algorithms).

Learning Outcome 1.
Students will describe the techniques and principles for the development of high performance computer systems.

Criteria

- Students will write a final report in CE 531 describing and explaining the details of extant computer architectures. All students should receive a score of 3 or higher when evaluated with the assignment’s rubric.
- This learning outcome will be measured by embedding specific questions (including several on lexical analysis) on the final exams in CE 513, 531, and 750. At least 90% of students will correctly answer all embedded questions.

Methods

- Faculty teaching CE 531 will submit final, ungraded reports to the program director. The program director will make a copy of the papers and return the original copy to the appropriate faculty. The program director will make sure to remove any student identifying information (e.g., name, SSN) from the copy. The program director will compile a representative sample of these papers to be distributed to the faculty for evaluation using the appropriate rubric. The faculty members will meet with the purpose of identifying students’ strengths and weaknesses and this assessment strategy. Where weaknesses are identified, recommendations will be developed and given to the entire faculty at the departmental meeting at the end of the spring semester.
- At the end of the semester, all faculty members who administered exams with embedded exam questions will submit this information to the department’s program director. The program director will upload this information into a database. The program director will aggregate and analyze the data, and submit a report to the department chair. Results will be shared and discussed with the department faculty as a whole at the end of the spring semester. Appropriate recommendations for the program change will be made and recorded in the program faculty minutes.
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Computer Engineering Master of Science graduates will be able to conduct and disseminate research that advances the state of knowledge in the field of inquiry.

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Learning Outcome 1.  
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- Final research proposal paper submitted in CE 511. Faculty will use the following scale: (1) Exceeds expectations with regards to quality of research question, (2) Meets expectations, or (3) Does not meet expectations. Graduate students demonstrate an adequate level of comprehension of framing research questions and formulating a research plan when at least 90% of students in CE 511 receive a rating of "meets expectations" or "exceeds expectations" by faculty members.
- Thesis proposal. Students ability to identify a research question and develop a research plan is rated by faculty on a scale of 0-3, where 0 = fail, 1 = borderline pass, 2= pass, and 3 = honors pass. Ninety percent of students should achieve a score of 2 or above on each of these dimensions.

Methods
- At the end of the semester, all faculty members who taught CE 511 will submit the ungraded final research papers to the program director. The program director will make a copy of the papers and return the original copy to the appropriate faculty. The program director will make sure to remove any student identifying information (e.g., name, SSN) from the copy. The program director will compile a representative sample of these papers to be distributed to the faculty for evaluation using the appropriate rubric. Faculty members will score the papers with the rubric. Scored rubrics will be returned to the program director for data analysis. The faculty members who taught CE 511 will then meet to discuss overall strengths and weaknesses of the students' papers. These results will be disseminated to the entire faculty at the end-of-the-semester departmental meeting.
- Members of the thesis proposal committee will rate the student's ability to identify a research question and develop a research plan on the aforementioned scale. In the case that a rater determines that a student is unsatisfactory or marginal in any dimension, the rater will provide narrative explanation of the nature and area of the deficiency. The scoring (and possible annotation thereof) of each student by each rater will be turned into the program director who will collapse the scores across students and raters. The program director will also collate and summarize any noted areas of deficiency. At the first program meeting of each academic year, the score will be reviewed by the program as a whole and potential problem areas in the training of our students will be identified. If problem areas are identified, the curriculum committee will develop curriculum changes that can remedy the problem.

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Criteria
- This research ability is also assessed through the thesis defense. Students ability to generate and analyze original research results, and to communicate these results in writing is rated by faculty on a scale of 0-3, where 0 = fail, 1 = borderline pass, 2= pass, and 3 = honors pass. All students should pass the thesis defense with a score of 2 or above on each of these dimensions.
- The number of papers authored/co-authored and the number of conference presentations given by graduate students is an indicator of research ability. The program director recommends that each student submit at least one manuscript for outside peer review, leading to reputable journals, and/or present research findings at conference proceedings. Acceptance of the manuscripts for publication is not required for graduation. Ninety percent of students should submit at least one manuscript for submission to a refereed archival journal, and/or present research at a conference.

Methods
- Members of the thesis defense committee will rate the student's ability to generate, analyze original research results, and to communicate these results on the aforementioned scale. In the case that a rater determines that a student is unsatisfactory or marginal in any discipline, the rater will provide narrative explanation of the nature and area of the deficiency. The scoring (and possible annotation thereof) of each student by each rater will be turned into the program director who will collapse the scores across students and raters. The program director will also collate and summarize any noted areas of deficiency. At the first program meeting of each academic year, the score will be reviewed by the program as a whole and potential problem areas in the training of our students will be identified. If problem areas are identified, the curriculum committee will develop curriculum changes that can remedy the problem.
• Students' major professors keep track of this information. Students’ major professors send notice to the program director when a manuscript is submitted and when one is accepted. The program director then enters this information into a database. At the end of the academic year, the program director aggregates the data and analyzes it. The summary of results is then given to the department chair, who is responsible for sharing and discussing this at the departmental meeting at the conclusion of the spring semester.

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All graduates will be competitive candidates for professional careers and/or Ph.D. study.

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All aspects of the curriculum contribute to this goal and are evaluated with respect to their success in contributing to the first two goals. In addition, students meet with their advisors to discuss placement issues and attend job talks within the department.

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Within two years of graduation with their MS degree, students will be engaged in professional careers and/or Ph.D. study.

Criteria
• Seventy percent of all students completing their MS degree will enter a doctoral program or obtain employment in a related field within two years of graduation.
• In Alumni Surveys, 85% of students surveyed will report each course as "beneficial" or "very beneficial" in (a) understanding an important area of computer science and engineering, and (b) being able to completely discuss engineering topics.

Methods
• All graduates will be contacted 2 years after their graduation date and asked to complete a paper or web-based survey (whichever is most convenient for the alum) to determine:
  -where each is employed or in graduate school,
  -the extent to which they were satisfied with their experience in the MS program, and
  -the extent to which they were prepared by the MS program.
Data from these survey forms will be analyzed by the program director and data summaries will be submitted to the department chair in an annual report.