

PROGRAM PERFORMANCE REVIEW

**Master of Science in Computer Engineering
College of Engineering and Computer Science
California State University, Fullerton**

Review Team

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INTRODUCTION

This report reflects the Program Performance Review (PPR) committee's assessment of the Master of Science in Computer Engineering program. The report is based on information gathered by the team on March 22, 2019, via interviews with the Computer Engineering faculty, graduate students, the Associate Dean and Dean of the College of Engineering and Computer Science (ECS). The intent of this report is to highlight the program's existing strengths and areas of improvement.

PROGRAM STRENGTHS

The committee found the following strengths of the program:

1. The curriculum is well structured and offers considerable flexibility

Students take 10 courses, of which six are required. The remaining four courses can be chosen from a long list of electives, consisting of courses offered by computer engineering and other departments in ECS. This allows students to customize the program to meet their needs and interests. In addition, the program offers flexibility by giving students a choice between three culminating experiences: a comprehensive exam, a project, or a thesis. The project has an applied focus, giving students the opportunity to demonstrate deep knowledge in an area of computer engineering that will help make them more attractive to employers. The thesis is more theoretical, allowing students who want to pursue a doctorate to get meaningful experience working with a faculty member on a research project and writing one or two manuscripts to be published in academic journals.

The six core courses, with an emphasis in integrated circuit (IC) design, prepare the students with the knowledge and skills needed to pursue a career in the semiconductor industry. Considering there are plenty of local semiconductor companies in Southern California (e.g., Broadcom, Qualcomm, Western Digital), this curriculum is well-suited to the local job market. In addition, three of the six core courses come with a final project which provides students with valuable hand-on experience.

2. Faculty make teaching a priority

Most of the Computer Engineering courses are taught by the full-time faculty, all of whom care very deeply about teaching. Students feel comfortable approaching the faculty outside of class. Faculty incorporate hands-on activities in the classroom to help students master the fundamentals and build a solid foundation in computer engineering. The class size is

fairly small (about 20 students per class), allowing students to get sufficient attention and guidance from the faculty.

3. Faculty is diverse and research-active

The Computer Engineering faculty are all research active and represent a diverse range of expertise. As a result, students have ample opportunities to partner with faculty on research (to satisfy the thesis requirement) or find a faculty who is willing to guide them as they work to satisfy the project requirement. Given their high teaching load, the research productivity of the faculty is admirable.

4. The Dean's Office is supportive of the program

The Dean and Associate Dean understand the dynamics, challenges, constraints and opportunities of the program. Based on this understanding, they do their best to provide support to enhance the program through funding, support for the professional growth of faculty, and by facilitating increased ties with industry to help students gain valuable experience and secure employment.

AREAS OF IMPROVEMENT

The committee recommends the following changes to further improve the program:

1. Encourage more students to complete a project or thesis

Most students choose to take the comprehensive exam (approximately 90%). But the project or thesis provide more value both in terms of helping the students master important concepts in computer engineering and making them more desirable by employers. Completing a project or thesis may be even more beneficial to international students (which make up the majority of the students in the program) because they often are unable to obtain internships due to visa issues. To ensure that students can meet their professional goals, the committee recommends encouraging more students to complete a project or thesis.

2. Make projects in current courses more rigorous and relevant

The committee spoke with a small group of students (n=3). While the committee acknowledges the small sample size, one universal sentiment that was expressed to us was

that the current projects that are assigned in the courses are too academic in nature, focusing primarily on reinforcing concepts covered in the textbook. As a result, students report that they are often unable to discuss such classroom projects on their resume or during interviews with potential employers. The committee suggests assigning projects that allow students to work on real-world challenges using tools that are commonplace in the industry (e.g., Cadence).

3. Expand course options to move beyond IC design

The six required courses in the program are heavily geared towards IC design. However, IC design is just one career path for computer engineering graduates. To make the program attractive to students with other interests and to leverage the broad knowledge of the computer engineering faculty, the committee suggests creating multiple tracks/pathways based on faculty expertise and industry demands. Each track/pathway would allow students to take courses in a specific topic area that is in demand within the industry. Another way to address this issue could be to reduce the number of core courses to allow students to take more electives based on their area of interest and career goals.

4. Seek ways to strengthen ties with industry

Another way to make students more marketable to employers might be to partner with external companies in a similar manner to what is done in the undergraduate programs, via corporate sponsorships where students work on projects for a specific company. Doing so might allow the in-class projects to be more rigorous and relevant (point #2 above).

SUMMARY

The Computer Engineering department is commended for their efforts in creating a high-quality graduate program that provides students with a solid foundation of core computer engineering concepts that are desired by employers. The department's faculty are also commended for their commitment to student success. The committee hopes that addressing the items mentioned in this report will further improve the program.

This report was reviewed and approved by all members of the Review Team to accurately reflect the program review that was conducted on March 22, 2019.