CALIFORNIA STATE UNIVERSITY, LONG BEACH
VICE PROVOST FOR ACADEMIC AFFAIRS

**Memorandum of Understanding**
Engineering and Computational Mathematics Program
College of Engineering
May 2019 (for 2018 review)

This Memorandum of Understanding outlines the consensus reached by the College of Engineering and the Division of Academic Affairs, based on the recently conducted program review (Self-study in 2017, External Review Visit in February 2018, and UPRC report in December, 2018). It describes the goals to be achieved, and the actions to be undertaken by all parties to this MOU to achieve these goals, during the next program review cycle. Progress toward goals is to be addressed in an annual report.

The Joint PhD is offered by Claremont College and the CSULB College of Engineering. Students take Mathematics courses at Claremont College, and Engineering Courses in the College of Engineering. There are no specific options for the degree, however the student may choose to take Engineering courses and perform research in their Engineering specialty of choice. The program requires 72 units of Mathematics and Engineering classes beyond the BS degree and allows transfer of up to 24 units of approved graduate classes for students entering the program with an MS degree. A minimum of 24 units must be completed at CSULB with another 24 units at CGU. In 2018 the Degree name was changed from PhD in Engineering and Industrial Applied Mathematics to a PhD in Engineering and Computational Mathematics.

The Program was last reviewed in 2006, with an MOU in 2010 with specific recommendations to: 1) improve the curriculum, 2) develop a student handbook, 3) improve tracking of student progress, 4) develop additional independent studies and research classes, and 5) provide funding support for faculty supervision and program miscellaneous needs. In response to the MOU, the program has developed three new classes, Engr. 796 (Doctoral Seminar), Engr. 797A (Preparation for Ph.D. Preliminary Examination), and Engr. 797B (Preparation for Ph.D. Qualifying Examination). In addition, a COE supervision policy has been developed providing the primary faculty advisor with 4 WTU vacant rate equivalent release time credit per Ph.D. dissertation completed. The release time is often used in subsequent semesters to reduce faculty's teaching load, with coordination and approval of their corresponding department chair. In 2011 an Administrative re-structuring occurred. Since then, tracking of Ph.D. students' progress has been enacted and all current and newly admitted students have faculty advisors, based on students' areas of interest and research focus. Emphasis has been placed on scholarly publications with the expectation that Ph.D. students will have at least three referred publications (conferences & Journals), upon graduation.

A number of strengths were identified in the reports.

1. The program positively responded to the last MOU with curricular and advising

changes.

2. The program secured external funding from the Denso Foundation, the Edwards Air Force base, an NIH BUILD grant, and the Port of Long Beach. Additional funding has been secured from industry and through the student equipment fund. These funds have been used to purchase equipment and create laboratories.
3. A National Science Foundation grant for over $520,000 afforded 6 Ph.D. students the opportunity to conduct research on topics related to disabilities.

Areas of Concern and Opportunities for Development were noted in the reports.

1. The Engineering and Computational Mathematics Program does not articulate a mission statement on the website or in the Self-Study. In addition, expected program learning outcomes (PLOs) are not clearly identified/listed.
2. The program averages 17 enrolled students per semester, however new enrollments have varied yearly. There are an average of 2 students that graduate each year. Length of time to graduation data was not presented.
3. The assessment of SLOs is informally measured in terms of completing the preliminary exams in mathematics and engineering as well as an oral defense. In addition, student publications are tracked. However, no active program-level assessment was taking place to track performance and make necessary changes to the program. The external reviewers also commented "The program would benefit from more direct and indirect assessment of student learning outcomes... as the program has several levels of examination but where, it appears, that systematic formal assessment has not been implemented".

It is therefore agreed that the College and Program will:

1. Articulate a mission statement and Program Learning Outcomes on the website.

2. Continue their ongoing program of assessment of institutional, programmatic, and student learning outcomes across the curriculum.

3. Provide an annual update (due June 1) on progress made towards the actions agreed to in this MOU to the COE dean, the Vice Provost for Academic Programs, and the Director of Program Review and Assessment. The review cycle will be 7 years from the time of the self-study from 2017-2023. A comprehensive self-study will be due June 2023 for 2023-2024 Academic Year external review/UPRC report process.

4. Re-evaluate the course offerings and required courses for the Ph.D. program to increase graduation rates with a target of 5 or more graduates per year.

5. Increase industry internship opportunities and industry-sponsored projects for Ph.D. dissertations.

6. Organize all-student and faculty advisor-inclusive program events.

7. As resources permit, secure funding to establish a Ph.D. student research fellowship program.

In addition, the Division of Academic Affairs will:

1. Provide funding to support improving graduate student culture.
    a. Baseline funding to support MS and PhD students, as well as support for faculty to mentor PhD students. This is non-renewable baseline funding. This funding will decrease incrementally over 4 years, with the expectation that during this time faculty will receive grant funding that will provide this support moving forward.
        i. 2019-2020: $60,000
        ii. 2020-2021: $40,000
        iii. 2021-2022: $20,000
        iv. 2022-2023 and thereafter: $0
    b. Flat rate of $10,000 per PhD student graduated in each Academic Year. If there is a significant change in the number of students to reach 10 or more per year, then renegotiation will occur.
    c. As a result of this funding it is expected that reduction in teaching load will occur, and that these faculty will:
        i. Compete for and receive external grants to provide support for PhD students to
            1. work as graduate teaching assistants or research assistants, and
            2. increase publications and presentations at the national and international conferences.
        ii. Promote their scholarly agenda and publish research in accordance with standards set by the College Dean's office.
2. As resources permit, continue to support the program with non-resident fee tuition waivers for recruiting qualified applicants.

This MOU has been read and approved by:

PhD Program Director: _____ Date: 7-11-2019
Hamid Rahai

College of Engineering Dean: _____ Date: 7/11/19
Forouzan Golshani

Vice Provost Academic Programs: _____ Date: 7-15-19
Jody Cormack