

# INTERDISCIPLINARY GRADUATE EMPHASIS IN COMPUTATIONAL SCIENCE AND ENGINEERING

<https://cse.ucsb.edu>

University of California, Santa Barbara

Student Name: \_\_\_\_\_

Perm: \_\_\_\_\_

## **EMPHASIS IN COMPUTATIONAL SCIENCE AND ENGINEERING – 2025-26**

Applicants must first be admitted to, or currently enrolled in a UCSB Master's or Ph.D. program participating in the Computational Science and Engineering (CSE) graduate emphasis: Chemical Engineering; Computer Science; Earth Science; Ecology, Evolution, and Marine Biology; Electrical and Computer Engineering; Mathematics; and Mechanical Engineering.

CSE is a rapidly growing multidisciplinary area with connections to the sciences, engineering, mathematics, and computer science. Computer models and simulations have become an important part of the research repertoire, supplementing (and in some cases replacing) experimentation. Going from application area to computational results requires domain expertise, mathematical modeling, numerical analysis, algorithm development, software implementation, program execution, analysis, validation, and visualization of results. CSE addresses these issues.

Although CSE includes elements from computer science, applied mathematics, engineering and science, it focuses on the integration of knowledge and methodologies from all of these disciplines and, as such, is a subject distinct from any of them.

REQUIRED COURSES			
<b>NUMERICAL METHODS</b> – Students must take at least three courses from the numerical methods sequence (ECE 210A-B-C-D, which is also cross-listed as ME 210A-B-C-D, MATH 206A-B-C-D, CS 211A-B-C-D, and ChemE 211A-B-C-D)			
COURSE #	COURSE NAME	UNITS	GRADE
<b>PARALLEL COMPUTING</b> – Students must take at least one course from Computer Science 240A-B.			
COURSE #	COURSE NAME	UNITS	GRADE
<b>APPLIED MATHEMATICS</b> – Students whose home department is not Mathematics must take either the Math 214A-B or Math 215A-B sequence (run concurrently with Math 119A-B and Math 124A-B respectively), or the CH E 230A-B sequence (cross-listed at ME 244A-B)*. Credit will not be given for more than one of these sequences.			

\* Advanced courses may be substituted, with approval, as follows: Math 243 instead of Math 214, and Math 246 instead of Math 215. Students whose home department is Mathematics must take a two course sequence from either Mathematics 243A-B or Mathematics 246A-B.

### **M.S./M.A. REQUIREMENTS (THESIS OPTION ONLY)**

Requirements for the Master's in one of the above departments (thesis option only) with the CSE emphasis are as follows:

- Complete the requirements for a Master's degree in the home department.
- Complete the CSE core course sequence.
- Write and defend a master's thesis in CSE.

The thesis must be written under the supervision of a CSE tenure-track faculty member from the chosen department. The thesis committee must include a minimum of three department Academic Senate members, at least two from the home department and one from CSE (may be CSE faculty member from another department). At least two members of every master's thesis committee must be tenure-track faculty.

Valid Committee: ☐

Approved Thesis Topic: \_\_\_\_\_

### **Ph.D. REQUIREMENTS**

Students pursuing a Ph.D. with an emphasis in CSE must:

- Complete the requirements for a Ph.D. in the home department.
- Complete the CSE core course sequence.
- Write and defend a dissertation in CSE.

The students' dissertation must be written under the supervision of a CSE tenure-track faculty member from the home department. The doctoral examination committee must include at least one CSE Academic Senate member and at least one Academic Senate member from another department. At least two members of every doctoral committee must be tenure-track faculty.

### **RESEARCH PAPER PRESENTATION**

Presentation of a research paper in a suitable academic forum, such as a Computational Science Colloquium, departmental colloquium, invited colloquium at another institution, or a professional meeting.

Research Paper Presented: \_\_\_\_\_

### **DISSERTATION**

A Ph.D. dissertation centrally focused on a question emerging from Computational Science and Engineering (CSE) with at least two committee members representing faculty participating in the CSE Interdisciplinary Emphasis. If one of the committee members is from outside the student's home department, the student will be required to have four faculty members on his/her dissertation committee (including three from the home department).

Valid Committee: ☐

Approved Thesis Topic: \_\_\_\_\_

VERIFICATION OF COMPLETION
EMPHASIS REQUIREMENTS SATISFIED (DATE): _____
EMPHASIS DIRECTOR SIGNATURE: _____
PRINT NAME: _____