Computational Engineering

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An Interdisciplinary Curriculum

The Computational Engineering graduate program is interdisciplinary, with faculty drawn from the academic departments of the College of Engineering and the College of Arts and Sciences, as well as the research faculty of the HPC[2]. Programs of study and research leading to both the Master of Science degree and the Doctor of Philosophy degree are offered on the Starkville Campus and through Distance Education. There is an increased demand by industry, academia, and government for scientists and engineers with a foundation to create tools for computational analysis and design, and with a strong domain knowledge for application of these tools to complex engineering problems. Such programs come with curricula covering a large range of subjects, so that they can produce scientists and engineers with broad backgrounds and viewpoints. These scientists and engineers can then be expected to understand the basic approaches to solving analytical problems and also using mathematical and computational tools required to arrive at solutions. The program is open to students with undergraduate degrees in engineering, computer science, mathematics, or a physical science. Research assistantships are available through research projects in the HPC[2].

Admission Criteria

To be admitted, the student must meet the admission requirements of the Office of the Graduate School and receive a positive recommendation from the Computational Engineering Graduate Coordinator. International students must have scored at least 550 PBT (79 iBT) on the Test of English as a Foreign Language (TOEFL) or 6.5 on the International English Language Testing System (IELTS). Students with a degree from a program that is not EAC/ABET accredited must have a satisfactory performance on the GRE.

Highly qualified undergraduate students may be considered for direct admission if the following criteria are met: a minimum equivalent GPA of 3.50/4.00 on the last 60 credit hours of undergraduate courses, or a first class with distinction degree classification for students from institutions where no GPA is reported, and a competitive GRE score for applicants from a non-ABET-accredited program.

Provisional Admission

A Master of Science applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. Provisional admission will not be considered for Ph.D. applicants.The following identify requirements in addition to those outlined by University policy in the *Graduate Catalog*. A provisionally-admitted student is eligible for a change to regular status after receiving a 3.30 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a B). The first 9 hours of graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.30 is not attained, the provisional student **shall** be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. While in the provisional status, a student is not eligible to hold a graduate assistantship.

Program of Study

The specific requirements for the degrees are governed by the requirements of the Office of the Graduate School, the College of Engineering, and by the student's graduate committee. The committee must include at least one Computational Engineering faculty member from each of the following areas:

a. a Computational Engineering application area,
b. high-performance computing, and
c. numerical mathematics.

The graduate committee will ensure that the student's program of study adequately addresses each of the three primary cross-disciplinary areas (an application area, high-performance computing, and numerical mathematics), and students are encouraged to include one or more courses in scientific visualization or data analytics. The composition of the graduate committee and the student's program of study must be approved by the Computational Engineering Graduate Coordinator.

Academic Performance

Continued enrollment in the program is contingent upon satisfactory performance in the courses and research and satisfactory performance toward completion of the degree. In addition to the University guidelines, satisfactory performance is achieved when all four of the following criteria are met:

a. The student maintains a B average or better on: a.) all graduate courses completed <u>and</u> b.) all graduate courses included on the program of study.
b. If the student registers for research credits in a given term, he/she receives a satisfactory (S) grade at the end of the term.
c. The student has a major advisor and supervisory graduate committee after the first two terms of enrollment.

In addition to the University guidelines for academic dismissal in the Graduate Catalog, a graduate student in the Computational Engineering program shall be dismissed if he or she receives two unsatisfactory (U) grades on research credit hours. A student will be placed on academic probation based on University guidelines in the Graduate Catalog, or if one of the following conditions are met:

a. A second C grade on the program of study
b. A grade of U on research credit hours

The probationary period is defined to be one term (summer is included if the student is enrolled). A probationary period of two terms may be considered for online students with a GPA below 3.0/4.0. If at the end of the probationary period the student has not remedied his/her deficiency (i.e., has not achieved a 3.00 GPA and/or has not scheduled research credit hours and received a satisfactory (S) grade) the student may be dismissed. For students enrolled in either the M.S. or Ph.D. program, all issues related to academic probation, dismissal, and appeal will be governed by University policy, as approved by Graduate Council and the Provost and outlined by the Graduate School in the Graduate Catalog.

Graduate Courses

Because of the interdisciplinary nature of the Computational Engineering program, courses listed under the "Courses" tab are typical of those used to assemble a program of study. Courses not listed can be used for graduate credit with the approval of the student's supervisory committee and the Computational Engineering Program Graduate Coordinator. The program of study must demonstrate the student has achieved a working knowledge of

a. a Computational Engineering application area,
b. high-performance computing, and
c. numerical mathematics

Master of Science in Computational Engineering - Thesis

8000-level coursework	12
Additional graduate-level coursework	12
Research/thesis	6
CME 8000	
Total Hours	**30**

Master of Science in Computational Engineering - Non-Thesis

8000-level coursework		15
Additional graduate-level coursework		15
Research project		3
CME 7000	Directed Individual Study in Computational Engineering	
Total Hours		**33**

Doctor of Philosophy in Computational Engineering

A Ph.D. in Computational Engineering requires the following credit hours beyond a B.S.

8000-level graduate coursework	24
Additional graduate-level coursework	24
Research/Dissertation	24
CME 9000	
Dissertation/Dissertation Research Hours in Computational Engineering	
Total Hours	**72**

Qualifying GPA credit hours from M.S. degree may be counted towards this requirement.

In addition to the coursework and research hours, includes a comprehensive examination, a dissertation, and dissertation defense. Each candidate for the doctoral degree must conduct research and in their dissertation defense on that research the student must:

a. demonstrate a mastery of the techniques of research and
b. make a very distinct contribution to the field of Computational Engineering.

The dissertation must conform to the policies and protocols of the Graduate School.