COMPUTATIONAL SCIENCE AND ENGINEERING

The Center for Computational Science and Engineering (CCSE) offers two educational programs, a master’s and a doctorate in computational science and engineering (CSE).

Master’s Program

The Master of Science in Computational Science and Engineering (CSE SM) is an interdisciplinary program that provides students with a strong foundation in computational methods for the study, design, and operation of complex engineered and scientific systems.

The CSE SM program educates students in the formulation, analysis, implementation, and application of computational approaches in science and engineering. The curriculum's common core serves all science and engineering disciplines, while an elective component focuses on particular applications. The program emphasizes:

- Breadth through introductory courses in numerical analysis and simulation, and optimization
- Depth in optimization methods and numerical methods for partial differential equations
- Multidisciplinary aspects of computation
- Hands-on experience through projects, assignments, and a master’s thesis

Participating faculty come from the Schools of Engineering, Science, and Management, including the Departments of Aeronautics and Astronautics, Biological Engineering, Chemical Engineering, Civil and Environmental Engineering, Electrical Engineering and Computer Science, Mathematics, Mechanical Engineering, and Nuclear Science and Engineering.

The research interests of CSE faculty cover a great variety of computationally intensive areas in engineering, science, and mathematics. Recent research has included such far-ranging topics as micromachined devices, guidance/control systems, imaging systems, distribution networks, telecommunications systems, and transportation systems. Faculty research encompasses applications in areas such as aircraft design, materials design, manufacturing operations scheduling, and applied optimization in operations and industrial engineering.

Doctoral Program

The doctoral program in Computational Science and Engineering (CSE PhD) allows students to specialize at the doctoral level in a computation-related field of their choice via focused coursework and a doctoral thesis through a number of participating host departments, including Aeronautics and Astronautics; Chemical Engineering; Civil and Environmental Engineering; Earth, Atmospheric and Planetary Sciences; Materials Science and Engineering; Mathematics; Mechanical Engineering; and Nuclear Science and Engineering. The emphasis of thesis research activities is the development of new computational methods and/or the innovative application of computational techniques to important problems in engineering and science.

The CSE program is administered jointly by CCSE and the host departments. Students must submit an online application (https://gradapply.mit.edu/cse/apply/login/?next=/cse) to the CSE PhD program, indicating the department they wish to be hosted in. To gain admission, CSE program applicants must receive approval from both the host department graduate admission committee and the CSE graduate admission committee. See the website for more information about the application process, requirements, and relevant deadlines (https://cse.mit.edu/admissions/phd).

Once admitted, doctoral degree candidates are expected to complete the host department's degree requirements (including qualifying exam) with CSE deviations relating to coursework, thesis committee composition and thesis submission that are specific to the CSE program and are discussed in more detail on the CSE website (https://cse.mit.edu/programs/phd).

Inquiries

For more information about CSE programs (https://cse.mit.edu/programs), contact Kate Nelson (cse_info@mit.edu), Room 35-434, 617-253-3725, or visit the program website.