The coursework requirements include:

- research performed under the supervision of a CSE faculty member.
- six graduate subjects with a master’s thesis describing original science and engineering. It combines a course of study comprising implementation and application of computational approaches in the context of a specific engineering or science discipline. For this reason, this degree is offered jointly with participating departments across the Institute; the interdisciplinary degree is awarded in a specially crafted thesis field that recognizes the student’s specialization in computation.

At the time of application, students are expected to declare which of the two programs they are interested in. Admissions decisions will take into account these declared interests, along with each applicant’s academic background, preparation, and fit to the program they have selected.

Applicants interested in an advanced degree in computer science should instead apply for admission to the Department of Electrical Engineering and Computer Science (https://www.eecs.mit.edu).

Master of Science in Computational Science and Engineering

The Master of Science in Computational Science and Engineering (CSE SM) (http://catalog.mit.edu/degree-charts/master-computational-science-engineering) is an interdisciplinary, research-oriented master’s program that provides students with a strong foundation in computational methods for the study, design, and operation of complex engineered and natural systems.

The curriculum trains students in the formulation, analysis, implementation, and application of computational approaches in science and engineering. It combines a course of study comprising six graduate subjects with a master’s thesis describing original research performed under the supervision of a CSE faculty member. The coursework requirements include:

- A three-subject core aimed at developing breadth as well as depth in numerical analysis, simulation, and optimization
- A two-subject restricted elective program aimed at reinforcing multidisciplinary aspects of computation
- One unrestricted elective subject

Hands-on experience is encouraged and reinforced through projects in the core, the elective subjects, and the master’s thesis.

Doctor of Philosophy in Computational Science and Engineering

The standalone doctoral program in Computational Science and Engineering (PhD in CSE) (http://catalog.mit.edu/degree-charts/phd-computational-science-engineering) enables students to specialize at the doctoral level in fundamental, methodological aspects of computational science via focused coursework and a thesis. The emphasis of thesis research activities is the development and analysis of broadly applicable computational approaches that advance the state of the art.

Students are awarded the Doctor of Philosophy in Computational Science and Engineering upon successful completion of the program requirements and defense of a thesis describing significant contributions to the CSE field. Program requirements include a course of study comprising nine graduate subjects and a graduate seminar. Core and concentration subjects cover six “ways of thinking” fundamental to CSE: (i) discretization and numerical methods for partial differential equations; (ii) optimization methods; (iii) statistics and data-driven modeling; (iv) high-performance computing and/or algorithms; (v) mathematical foundations (e.g., functional analysis, probability); and (vi) modeling (i.e., a subject that treats mathematical modeling in any science or engineering discipline). Subjects taken as part of an MIT SM program can be counted toward the coursework requirement provided they satisfy core, concentration, or elective requirements as set forth here (http://catalog.mit.edu/degree-charts/phd-computational-science-engineering); consultation and approval by the program director(s) and/or administrator regarding the application of such courses toward program credit is always required.

Students applying to this program are expected to have a degree in CSE, applied mathematics, or another field that prepares them for an advanced degree in CSE. More information about the application process, requirements, and relevant deadlines can be found on the Admissions section of the CCSE website (https://cse.mit.edu/admissions).

Interdisciplinary Doctoral Program in Computational Science and Engineering

The interdisciplinary doctoral program in Computational Science and Engineering (PhD in CSE + Engineering or Science (http://catalog.mit.edu/degree-charts/phd-computational-science-engineering/#phdincseengineeringorsciencetext)) offers students the opportunity to specialize at the doctoral level in a computation-related field of their choice via computationally-oriented coursework.
and a doctoral thesis with a disciplinary focus related to one of eight participating host departments, namely, Aeronautics and Astronautics; Chemical Engineering; Civil and Environmental Engineering; Earth, Atmospheric and Planetary Sciences; Materials Science and Engineering; Mathematics; Mechanical Engineering; or Nuclear Science and Engineering.

Doctoral thesis fields associated with each department are as follows:

- **Aeronautics and Astronautics**
  - Aerospace Engineering and Computational Science
- **Chemical Engineering**
  - Chemical Engineering and Computation
- **Civil and Environmental Engineering**
  - Civil Engineering and Computation
  - Environmental Engineering and Computation
- **Materials Science and Engineering**
  - Computational Materials Science and Engineering
- **Mechanical Engineering**
  - Mechanical Engineering and Computation
- **Nuclear Science and Engineering**
  - Computational Nuclear Science and Engineering
  - Nuclear Engineering and Computation
- **Earth, Atmospheric and Planetary Sciences**
  - Computational Earth, Science and Planetary Sciences
- **Mathematics**
  - Mathematics and Computational Science

As with the standalone CSE PhD program, the emphasis of thesis research activities is the development of new computational methods and/or the innovative application of state-of-the-art computational techniques to important problems in engineering and science. In contrast to the standalone PhD program, however, this research is expected to have a strong disciplinary component of interest to the host department.

The interdisciplinary CSE PhD program is administered jointly by CCSE and the host departments. Students must submit an application to the CSE PhD program, indicating the department in which they wish to be hosted. 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).

Once admitted, doctoral degree candidates are expected to complete the host department's degree requirements (including qualifying exam) with some 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). The most notable coursework requirement associated with this CSE degree is a course of study comprising five graduate subjects in CSE.

**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 (https://cse.mit.edu).