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 operation of complex engineered and natural systems.
- a foundation in computational methods for the study, design, and oriented master's program that provides students with a strong computational-science-engineering (CSE SM) foundation.

The Master of Science in Computational Science and Engineering (CSE SM) (https://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.

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).
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).