INSTITUTE FOR DATA, SYSTEMS, AND SOCIETY

Graduate Study

IDSS provides educational programs anchored in the following intellectual pillars: statistics, information and decision sciences, and human and institutional behavior.

IDSS's academic programs embrace the collision and synthesis of ideas and methods from analytical disciplines, including statistics, stochastic modeling, information theory and inference, systems and control theory, optimization, economics, human and social behavior, and network science. Each of these fields in isolation is an insufficient basis for a deep understanding of complex interactions and systems. However, the intersections of these disciplines provide new tools and perspectives for understanding complex systems, addressing overarching challenges (including sustainability and systemic risk), and presenting design principles and architectures that enable those systems' quantification, management, and regulation.

Inquiries about IDSS academic programs may be directed to the Academic Office (*idss_academic_office@mit.edu*).

Admission Requirements for Graduate Study
Application forms for all programs (*http://web.mit.edu/admissions/ graduate*) are available online. Applicants whose first language is not English must offer evidence of written and oral proficiency in English by registering for the International English Language Testing System (IELTS) exam (*http://www.ielts.org*), academic format, and achieving a score of 7.5 or better. Information about the Graduate Record Examinations (GRE) (*https://idss.mit.edu/academics*) can be obtained through the IDSS website. Applicants should refer to the details of each program concerning specific requirements for admission.

Master of Science in Technology and Policy
The Technology and Policy Program (TPP) (*http://tpp.mit.edu*) educates students seeking leadership roles in the constructive development and use of technology—an area that is not well served by the traditional education of technical or social science specialists. TPP focuses on meeting the need for leaders who are engineers and scientists—people with not only strong technical foundations but also the skills and abilities to deal cogently and effectively with the economic, political, and administrative dimensions of the technological challenges of the 21st century.

The Master of Science in Technology and Policy is an engineering research degree with a focus on the increasingly central role of technology in the framing, formulation, and resolution of policy problems. Many students combine TPP's curriculum with complementary subjects to obtain dual degrees in TPP and either a specialized branch of engineering or an applied social science, such as political science or urban studies and planning.

TPP's coursework provides a solid grounding in technology and policy by combining advanced subjects in the student's chosen technical field with courses in economics, politics, modern quantitative methods, and social science. All students must complete a satisfactory research thesis that has a substantial technology and policy component. In order to prepare students for effective professional practice, TPP stresses leadership and communication. It also encourages students to participate in TPP's summer internship program, which places students in government and industry in the US and around the world.

The TPP curriculum consists of three blocks of subjects and a research thesis. The first block is a required integrative subject in technology and policy and a subject in applied quantitative methods. The second block focuses on training in formal frameworks for policy development and consists of subjects in microeconomics, political economy, and one core restricted elective that treats problems of technology and policy from a domain that is outside that of the students' area of research concentration and deepens the students' understanding of framings and rationales for governance in this area. The third block comprises a minimum of three coherent electives that fulfill professional and research objectives. The research thesis is the culmination of scholarship integrating technology and policy.

Completion of the academic and research requirements of the TPP SM typically takes four terms.

The TPP curriculum normally begins in September; applications are due by December 15. TPP seeks applicants with relevant work or research experience as well as the ability to demonstrate evidence of leadership and initiative in their professional or other activities. All applicants should have a strong basis in engineering or science. For the 2025 admissions cycle, the GRE General Test will be optional.

Contact the TPP program office (*tpp@mit.edu*), Room E17-373, 617-258-7295, for additional information.

Doctor of Philosophy in Social and Engineering Systems

The Doctor of Philosophy in Social and Engineering Systems (SES) (*http://idss.mit.edu/academics/ses_doc*) is focused on addressing concrete and societally significant problems by combining methods from engineering and the social sciences. A student's doctoral program includes coursework that prepares them for advanced, rigorous, and original research leading to a doctoral thesis. Both coursework and research must include breadth and depth in engineering and quantitative methods, as well as in the social sciences, and in a particular application domain.

Student research in SES is characterized by the following traits:

- It is driven by problems of societal interest, in areas such as energy, finance, health care, social networks, urban science, as well as in policy-related topics.
- It is application domain driven.
- It involves quantitative methods. The program is focused on problems that can be addressed through mathematical modeling and data analysis.
- It relies on real-world data. Research is expected to analyze data from the application domain of interest, and draw upon the training provided in statistics, etc., through the program's coursework.
- It engages societal aspects of the problem. The research incorporates theories and tools from the social sciences.

The program's subject requirements follow. Waivers for some of the requirements are possible in special circumstances.

Core

Select 12 units from each of three areas below:

Probability

6.7700[J]	Fundamentals of Probability

Statistics

18.6501	Fundamentals of Statistics
18.655	Mathematical Statistics
IDS.160[J]	Mathematical Statistics: a Non-Asymptotic Approach
IDS.131[J]	Statistics, Computation and Applications

Social Science

17.850	Political Science Scope and Methods
21A.809	Designing Empirical Research in the Social Sciences
21A.819	Ethnographic Research Methods

Microeconomics / Causal Inference

14.121 & 14.122	Microeconomic Theory I and Microeconomic Theory II
14.320	Econometric Data Science
14.386	New Econometric Methods
14.388	Inference on Causal and Structural Parameters Using ML and AI
17.802	Quantitative Research Methods II: Causal Inference

Information Systems and Decision Science

Five subjects in the areas of probabilistic modeling, statistics, optimization, or systems/control theory, including:

One subject from the list of Statistical Processing of Data Subjects below

One subject of substantial mathematical content [1]

Two subjects belonging to a sequence that provides increasing depth on a particular topic [2]

Social Science

Four subjects that create a coherent and rigorous program of study in the social sciences, providing necessary background for research, including:

Three subjects comprising a coherent collection that builds depth in a particular social science focus area [2]

Problem Domain

Two subjects in the application domain of the student's research [3,4]

[1] Criteria defined by the graduate program committee.

[2] Subjects used to satisfy the core can be counted toward this requirement. However, the remaining subjects should be at a more-advanced level.

[3] One subject may be satisfied by an internship or independent study in which the student is evaluated on their performance of hands-on work in a particular domain.

[4] One subject may also be counted toward the social science requirement.

Statistical Processing of Data Subjects

6.7810	Algorithms for Inference	12
6.7900	Machine Learning	12
9.520[J]	Statistical Learning Theory and Applications	12
14.382	Econometrics	12
15.077[J]	Statistical Machine Learning and Data Science	12
16.391	Statistics for Engineers and Scientists	12
17.802	Quantitative Research Methods II: Causal Inference	12
17.804	Quantitative Research Methods III: Generalized Linear Models and Extensions	12
17.806	Quantitative Research Methods IV: Advanced Topics	12

The program begins in September and applications are due by December 15 of the preceding year.

Further information about SES is available on the program website (*http://idss.mit.edu/academics/ses_doc*) or by contacting the IDSS Academic Office (*idss_academic_office@mit.edu*), Room E17-375, or 617-253-1182.