Modern technology platforms combine complex human decisions with rapid online computation and data processing.

6-14

Bachelor of Science in Computer Science, Economics and Data Science

6-14 equips students with a foundational knowledge of economic analysis, computing, optimization and data science, as well as hands-on experience with empirical analysis of economic data, to identify, analyze and solve real-world challenges in real and virtual settings.

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MIT SCHOOL OF HUMANITIES, ARTS, & SOCIAL SCIENCES
great ideas change the world

MIT EECS
ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

MIT Economics

WHY MAJOR IN 6-14?

Students majoring in 6-14 will graduate with a foundational knowledge of economic analysis, computing, optimization and data science, having also acquired hands-on experience in empirical analysis of data to uncover and solve real-world problems.

The required subjects include core courses in programming, algorithms, microeconomics and econometrics. The requirements are complemented with electives in machine learning, optimization, applied econometrics and economics theory subjects (including market design, applied game theory, networks and strategy and information).

WHAT'S 6-14 ALL ABOUT?

Contemporary electronically mediated platforms for market-level and individual exchange combine complex human decisions with intensive computation and data processing, all operating within an engineered economic environment. Examples include: online markets, crowdsourcing platforms, spectrum auctions, financial platforms, crypto-currencies and large scale matching/allocation systems such as kidney exchange and public school choice systems. These platforms encompass a growing slice of economic activity and are shifting the scope and efficiency of market and non-market exchanges. Some forms of exchange that were simply infeasible due to coordination or information frictions (centralized kidney exchange, vehicle sharing) are suddenly available and important. Other market activities that were previously thought to require centralization and oversight can now be decentralized and self-regulated (crypto-currency being the leading example), and the technology beneath that decentralization (so-called blockchain) will have many further critical applications.

This emerging sphere of technological and economic activity draws expertise from three academic disciplines: computer science, economics and data science. Computer science supplies the procedures and algorithms on which these technologies operate. Data science structures, parses and interprets the vast set of informational inputs and outputs that move through these platforms. Economics guides the design of platforms, predicts and interprets their emergent properties and sets the incentives faced by market actors to generate desirable outcomes (e.g., efficiency, transparency, incentive compatibility, public goods provision).

CAREER PATHWAYS

We anticipate that MIT students trained in the 6-14 skill set will be sought after by technology companies (Amazon, Google, Microsoft, Yahoo, Ebay, Uber, Zillow, etc.), consulting companies (Bates & White, Cornerstone, Analysis Group), financial firms (Citadel, Blackrock) and U.S. government agencies.

Program Curriculum and Course Selection

15 classes in total

9 Foundational courses: Programming, Algorithms, Probability, Data Science, Economics, Econometrics (5 EECS, 2 Economics, 1 Econ/EECS/Math, 1 Math)

1 Theory elective: Optimization Methods (1 EECS)

3 Data Science, Empirical Analysis and Economic Theory electives (3 Economics)

2 Project-based, Communication-Intensive courses (1 EECS, 1 Economics)

Required Subjects (Units)
Mathematics
One of 18.06 Linear Algebra (12)or 6.S084, or 18.061

Computation/Algorithms
6.100A Introduction to Computer Science Programming in Python (6)
6.100B Introduction to Computational Thinking and Data Science (6) or 6.1010 Fundamentals of Programming (12)
6.1210 Introduction to Algorithms (12)
6.1200 Mathematics for Computer Science (12)
6.1220 Design and Analysis of Algorithms (12)

Economics
14.01 Principles of Microeconomics[1] (12)
14.32 Econometric Data Science (12)

Introductory Probability and Statistics (12)
Select one of the following:
6.3700 Introduction to Probability
14.30 Introduction to Statistical Methods in Economics
18.600 Probability and Random Variables

Data Science
6.3900 Introduction to Machine Learning (12)

EECS Project-based (9)
6.UAT Oral Communication (CI-M)[2] or 15.276 Communicating with Data (CI-M)

Economics Project-based
Select one of the following: (12)
14.05 Intermediate Macroeconomics (CI-M)[3]
14.18 Mathematical Economic Modeling (CI-M)
14.33 Research and Communication in Economics: Topics, Methods, and Implementation (CI-M)

Elective Subjects
Select one of the following: (12)
6.3260/14.15[J] Networks
15.053 Optimization Methods in Business Analytics
6.7201 Optimization Methods

Select three of the following, including at least one subject from each group: (36)

Data Science
14.20 Industrial Organization: Competitive Strategy and Public Policy
14.27 Economics and E-Commerce
14.36 Advanced Econometrics
14.38 Inference on Causal and Structural Parameters Using ML and AI
14.41 Public Finance and Public Policy
14.42 Environmental Policy and Economics
14.43 Economics of Energy, Innovation, and Sustainability
14.44 Energy Economics and Policy
14.64 Labor Economics and Public Policy
14.75 Political Economy and Economic Development
14.76 Firms, Markets, Trade and Growth
15.780 Stochastic Models in Business Analytics

Theory
14.04 Intermediate Microeconomic Theory
14.12 Economic Applications of Game Theory
14.13 Psychology and Economics
14.15[J] Networks
14.16 Strategy and Information
14.19 Market Design
14.26 Organizational Economics
14.54 International Trade

Up to 3 HASS Economics subjects taken within the major can be counted towards the HASS requirement. At most one REST subject in the major (14.30, 6.042, 18.06, or 18.600) may be counted toward the REST requirement. 14.32 or 6.009 may be used to satisfy the Institute laboratory requirement.

[1] *14.03 Microeconomic Theory and Public Policy is also an acceptable option.*
[2] *6.UAR Seminar in Undergraduate Advanced Research is also an acceptable option.*
[3] *Subject has prerequisites that are outside of the program.*