DEPARTMENT OF ECONOMICS

Economics is a broad field that aims to understand why the world works as it does and how government and other interventions might affect wellbeing. The field is diverse methodologically, encompassing mathematical modeling, data science, and randomized trials as appropriate. It interacts both with other social sciences, as with political science and psychology in the attempt to better understand government and individual behavior, and with the sciences, as with statistics and computer science in developing data analysis techniques.

Economics studies decision-making at the individual level and the aggregate outcomes that result when individuals, firms, institutions and governments interact. It remains concerned with classic topics, such as the causes of business cycles, the effects of industry regulations, and the consequences of tax policies, but also focuses on the diverse social challenges of the developed and developing world: poverty, education, health, the environment, and inequality.

The Department of Economics offers subjects at multiple levels in the three core areas of the discipline—microeconomic theory, macroeconomics, and econometrics—and specialized subjects in many applied fields, including development economics, environmental economics, health economics, industrial organization, international trade, labor economics, political economy, and public finance.

The department offers several undergraduate programs that prepare students for careers in business, finance, consulting, law and public policy, and for further study. Its doctoral program is frequently ranked as the best in the world.

Undergraduate Study

Bachelor of Science in Economics (Course 14-1)

Course 14-1, leading to the Bachelor of Science in Economics (http://catalog.mit.edu/degree-charts/economics-course-14), provides students with a breadth and depth of training in economics that is unusual at the undergraduate level. It combines training in technical economics with in-depth exploration of students’ areas of interest. Students choose from a diverse set of upper level undergraduate subjects and are encouraged to engage in independent research.

The aims of the SB in Economics degree program are threefold: to give students a firm grounding in economic theory and data analysis, to develop in-depth knowledge of particular economic issues, and to develop students’ capabilities for independent research. These aims correspond roughly to the requirements in the Course 14-1 program of theory, statistics and econometrics, electives, and research.

The requirements allow substantial freedom for students in designing individual programs within economics, and in balancing the program with subjects in other disciplines. The ample elective slots let students apply their technical skills to develop a deep understanding of whatever interests them, whether that is poverty in developing countries, international trade, game theory, for example. The department recommends that students interested in graduate work in economics build their technical skills with additional subjects in mathematics and computer science. Students can also complement their studies in the major with subjects in political science, history, and other social sciences.

The major is sufficiently flexible that students can transfer into the major or add it as a second major without having taken courses beyond 14.01 Principles of Microeconomics and 14.02 Principles of Macroeconomics in the first two years. Students typically complete an intermediate micro subject, 14.05 Intermediate Macroeconomics, 14.30 Introduction to Statistical Methods in Economics, and 14.32 Econometric Data Science by the third year. This satisfies the prerequisites for all subjects (including 14.33 Research and Communication in Economics: Topics, Methods, and Implementation) and prepares students for research on their thesis and in other elective subjects.

Bachelor of Science in Mathematical Economics (Course 14-2)

The SB in Mathematical Economics (http://catalog.mit.edu/degree-charts/mathematical-economics-course-14-2) is designed for students who desire a deeper mathematical foundation, and allows them to concentrate in a subset of economics topics. This program is well suited to students interested in mathematical microeconomic theory or econometrics. Students will gain the strong mathematical and theoretical preparation needed for subsequent graduate study in economics.

Students majoring in Mathematical Economics start with the same introductory micro and macro courses as 14-1 majors. They go on to take a program that includes rigorous mathematical training in microeconomic theory and econometrics, and substantial coursework in mathematics, including 18.100x Real Analysis, a choice between 18.06 Linear Algebra or 18.03 Differential Equations, and at least one mathematics seminar.

Bachelor of Science in Computer Science, Economics, and Data Science (Course 6-14)

The Department of Electrical Engineering and Computer Science (http://catalog.mit.edu/schools/engineering/electrical-engineering-computer-science) and the Department of Economics (p. 3) offer a joint curriculum leading to a Bachelor of Science in Computer Science, Economics and Data Science (Course 6-14) (http://catalog.mit.edu/degree-charts/computer-science-economics-data-science-course-6-14). The interdisciplinary major provides students a portfolio of skills in economics, computing, and data science that are increasingly valued in both the business world and academia. The economics and computer science disciplines have a substantial overlap both in their reliance on game theory and mathematical modeling techniques and their use of data analytics. The economics side of the program
includes subjects in microeconomic theory and econometrics and electives that expose students to how economists in various fields use mathematical models and statistical evidence to think about problems. The computer science side includes a number of subjects that develop complementary knowledge, including the study of algorithms, optimization, and machine learning (which is increasingly integrated with econometrics). The program also includes coursework in several mathematical subjects, including linear algebra, probability, discrete mathematics, and statistics, which can be taken in various departments.

The Course 6-14 major is also well suited to students whose primary interest is in game theory and mathematical modeling. It can prepare students for graduate study in either discipline.

**Minor in Economics**

The objective of the minor is to extend the understanding of economic issues beyond the level of the concentration. This is done through specialized analytical subjects and elective subjects that provide an extensive treatment of economic issues in particular areas.

The Minor in Economics consists of six subjects arranged into three levels of study:

<table>
<thead>
<tr>
<th>Tier</th>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier I</td>
<td>Principles of Microeconomics ¹</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Principles of Macroeconomics ¹</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Introduction to Statistical Methods in Economics ²</td>
<td>12</td>
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<tr>
<td></td>
<td>Introduction to Probability and Statistics</td>
<td></td>
</tr>
<tr>
<td>Tier II</td>
<td>Select one of the following:</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Microeconomic Theory and Public Policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate Microeconomic Theory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate Macroeconomics</td>
<td></td>
</tr>
<tr>
<td>Tier III</td>
<td>Select two elective subjects in applied economics.²</td>
<td>24</td>
</tr>
<tr>
<td>Total Units</td>
<td></td>
<td>72</td>
</tr>
</tbody>
</table>

¹ Under no circumstances may a student complete a minor with fewer than six subjects. Any student who receives permission from the Economics Department to skip 14.01 and/or 14.02 in order to take a higher-level subject must take a replacement subject for each subject that is skipped.

² See the department’s website for a list of available subjects (http://economics.mit.edu/under/minors).

**Inquiries**

For more information regarding admissions or financial aid (evako@mit.edu), contact Julia Martyn-Shah, 617-253-8787. For undergraduate admissions and academic programs (gking@mit.edu), contact Gary King, 617-253-0951. For any other information, (memiller@mit.edu) contact Megan Miller, 617-253-3807.

**Graduate Study**

**Admission Requirements for Graduate Study**

The Department of Economics specifies the following prerequisites for graduate study in economics: one full year of college mathematics and an appreciable number of professional subjects in economics for those qualified students who have majored in fields other than economics. Applicants for admission who have deficiencies in entrance requirements should consult with the department about programs to remedy such deficits.

**Master of Science in Economics**

In unusual circumstances, admission may be granted to current MIT students seeking the Master of Science degree. The general requirements for the SM (http://catalog.mit.edu/mit/graduate-education/general-degree-requirements/#mastersdegreetext) are given in the section on Graduate Education.

**Master of Applied Science in Data, Economics, and Development Policy**

The Master of Applied Science in Data, Economics, and Development Policy (http://catalog.mit.edu/degree-charts/master-applied-data-economics-development-policy) is an intensive program consisting of a series of nine subjects plus a capstone experience (a summer internship and a corresponding project report). Students will gain a strong foundation in microeconomics, development economics, probability, and statistics; engage with cutting-edge research; and develop practical skills in data analysis and the evaluation of social programs. Only students who have successfully completed the MITx MicroMasters (https://micromasters.mit.edu/dedp) credential in Data, Economics and Development are eligible to apply to the on-campus Master’s program.

Email for more information (dedp_masters@povertyactionlab.org) or visit the website (https://economics.mit.edu/masters).

**Doctor of Philosophy**

A candidate for the doctorate must demonstrate mastery of core content in microeconomic theory, macroeconomics, and econometrics; complete further coursework in four fields of study; and submit and defend a dissertation that represents a contribution to knowledge. The four fields are chosen from advanced economic theory, econometrics, economic development, finance, industrial organization, international economics, labor economics, monetary economics, organizational economics, political economy, and public economics. Each may be satisfied by one year of coursework, although additional coursework in a student’s primary field is often recommended.
There is no required minimum number of graduate subjects in the department. Students must be in residence for a minimum of two years. However, candidates ordinarily need two full academic years of study to complete the core and field requirements, and the doctoral thesis typically requires three or four years of additional research effort.

**Interdisciplinary Program**

**Economics and Statistics**
The Interdisciplinary Doctoral Program in Statistics provides training in statistics, including classical statistics and probability as well as computation and data analysis, to students who wish to integrate these valuable skills into their primary academic program. The program is administered jointly by the departments of Aeronautics and Astronautics, Economics, Mathematics, Mechanical Engineering, Physics, and Political Science, and the Statistics and Data Science Center within the Institute for Data, Systems, and Society. It is open to current doctoral students in participating departments. For more information, including department-specific requirements, see the full program description ([http://catalog.mit.edu/interdisciplinary/graduate-programs/phd-statistics](http://catalog.mit.edu/interdisciplinary/graduate-programs/phd-statistics)) under Interdisciplinary Graduate Programs.

**Financial Support**
Many doctoral students are supported by scholarship and fellowship grants, as well as by teaching and research assistantships.

**Inquiries**
For more information regarding admissions or financial aid ([evako@mit.edu](mailto:evako@mit.edu)), contact Julia Martyn-Shah, 617-253-8787. For undergraduate admissions and academic programs ([gking@mit.edu](mailto:gking@mit.edu)), contact Gary King, 617-253-0951. For any other information ([memiller@mit.edu](mailto:memiller@mit.edu)), contact Megan Miller, 617-253-3807.

**Faculty and Teaching Staff**
Glenn Ellison, PhD
Gregory K. Palm (1970) Professor
Professor of Economics
Head, Department of Economics

Arnaud Costinot, PhD
Professor of Economics
Associate Head, Department of Economics

**Professors**
Alberto Abadie, PhD
Professor of Economics
Associate Director, Institute for Data, Systems, and Society

Daron Acemoglu, PhD
Institute Professor
Professor of Economics
Member, Institute for Data, Systems, and Society
(On leave)

George-Marios Angeletos, PhD
Professor of Economics
(On leave)

Joshua Angrist, PhD
Ford Professor
Professor of Economics

David Atkin, PhD
Professor of Economics

David H. Autor, PhD
Ford Professor
Professor of Economics
(On leave)

Abhijit Banerjee, PhD
Ford International Professor
Professor of Economics

Ricardo J. Caballero, PhD
Ford International Professor
Professor of Economics

Victor V. Chernozhukov, PhD
Ford International Professor
Professor of Economics
Member, Institute for Data, Systems, and Society

David J. Donaldson, PhD
Professor of Economics

Esther Duflo, PhD
Abdul Latif Jameel Professor of Poverty Alleviation and Development Economics
Member, Institute for Data, Systems, and Society

Amy Finkelstein, PhD
John and Jennie S. MacDonald Professor
Professor of Economics
(On leave)

Drew Fudenberg, PhD
Paul A. Samuelson Professor
Professor of Economics

Robert S. Gibbons, PhD
Sloan Distinguished Professor of Management
Professor of Applied Economics
(On leave, spring)
Jonathan Gruber, PhD
Ford Professor
Professor of Economics

Paul L. Joskow, PhD
Elizabeth and James Killian Professor Post-Tenure
Professor Post-Tenure of Economics

Stephen Morris, PhD
Peter A. Diamond Professor
Professor of Economics

Whitney K. Newey, PhD
Ford Professor
Professor of Economics
Member, Institute for Data, Systems, and Society

Benjamin A. Olken, PhD
Jane Berkowitz Carlton and Dennis William Carlton Professor
Professor of Economics

Parag Pathak, PhD
Class of 1922 Professor
Professor of Economics

James M. Poterba, PhD
Mitsui Professor
Professor of Economics

Nancy L. Rose, PhD
Charles P. Kindleberger Professor of Applied Economics
Professor of Economics
(On leave)

Robert Townsend, PhD
Elizabeth and James Killian (1926) Professor
Professor of Economics
(On leave)

Ivan Werning, PhD
Robert M. Solow Professor
Professor of Economics

Michael Whinston, PhD
Society of Sloan Fellows Professor of Management
Professor of Economics
Professor of Applied Economics

Alexander Greenberg Wolitzky, PhD
Professor of Economics
(On leave, fall)

Muhamet Yildiz, PhD
Professor of Economics

Associate Professors
Nikhil Agarwal, PhD
Associate Professor of Economics

Anna Mikusheva, PhD
Associate Professor of Economics

Frank Schilbach, PhD
Gary Loveman Career Development Professor
Associate Professor of Economics

Assistant Professors
Clare Balboni, PhD
3M Career Development Professor of Environmental Economics
Assistant Professor of Economics

Ian Ball, PhD
Assistant Professor of Economics

Martin Beraja, PhD
Pentti Kouri Career Development Professor
Assistant Professor of Economics
(On leave, spring)

Simon Jaeger, PhD
Silverman (1968) Family Career Development Professor
Assistant Professor of Economics

Tobias Salz, PhD
Castle Krob Career Development Professor
Assistant Professor of Economics
(On leave)

Christian Wolf, PhD
Assistant Professor of Economics

Visiting Professors
Chris Edmond, PhD
Visiting Professor of Economics

Visiting Assistant Professors
Peter Ganong, PhD
Visiting Assistant Professor of Economics

Charles Murry, PhD
Visiting Assistant Professor of Economics

Heather Sarsons, PhD
Visiting Assistant Professor of Economics
Jan Stuhler, PhD
Visiting Assistant Professor of Economics

Senior Lecturers
Sara F. Ellison, PhD
Senior Lecturer in Economics

Visiting Instructors
Hunt Allcott, PhD
Visiting Instructor in Economics

Nicolas Lambert, PhD
Visiting Instructor in Economics

Professors Emeriti
Olivier Jean Blanchard, PhD
Robert M. Solow Professor Emeritus
Professor Emeritus of Economics

Peter A. Diamond, PhD
Institute Professor Emeritus
Professor Emeritus of Economics

Richard S. Eckaus, PhD
Ford International Professor Emeritus
Professor Emeritus of Economics

Stanley Fischer, PhD
Professor Emeritus of Economics

Jeffrey E. Harris, MD, PhD
Professor Emeritus of Economics

Jerry A. Hausman, PhD
John and Jennie S. MacDonald Professor Emeritus
Professor Emeritus of Economics

Bengt Holmström, PhD
Paul A. Samuelson Professor Emeritus
Professor Emeritus of Economics
Professor Emeritus of Applied Economics

Michael J. Piore, PhD
David W. Skinner Professor Emeritus
Professor Emeritus of Political Economy
Professor Emeritus of Political Science

Richard Schmalensee, PhD
Howard W. Johnson Professor Emeritus
Professor Emeritus of Management
Professor Emeritus of Economics

Robert M. Solow, PhD
Institute Professor Emeritus
Professor Emeritus of Economics

Peter Temin, PhD
Elisha Gray II Professor Emeritus
Professor Emeritus of Economics

William C. Wheaton, PhD
Professor Emeritus of Urban Studies and Planning
Professor Emeritus of Economics

General Economics and Theory

14.00 Undergraduate Internship in Economics
Prereq: Permission of instructor
U (IAP, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

For Course 14 students participating in off-campus internship experiences in economics. Before registering for this subject, students must have an employment offer from a company or organization and must identify a Course 14 supervisor. Upon completion of the internship, student must submit a letter from the employer describing the work accomplished, along with a substantive final report from the student approved by the MIT supervisor. Subject to departmental approval. Consult departmental undergraduate office.

Consult D. Donaldson

14.000 Graduate Internship in Economics
Prereq: Permission of instructor
G (IAP, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

For Course 14 students participating in off-campus internship experiences in economics. Before registering for this subject, students must have an employment offer from a company or organization and must identify a Course 14 supervisor. Upon completion of the internship, student must submit a letter from the employer describing the work accomplished, along with a substantive final report from the student approved by the MIT supervisor. Subject to departmental approval. Consult departmental graduate office.

Consult R. Caballero
14.001 Data Economics and Development Policy Summer Internship
Prereq: Permission of department
G (Fall, Spring, Summer)
0-1-0 units
Provides students in the DEDP Master’s program the opportunity to synthesize their coursework and professional experience in development economics and data analysis. In the context of a summer internship, students apply the knowledge gained in the program towards a project with a host organization, typically in the development sector. Students will be supported in finding a suitable opportunity or research project. All internship placements are subject to approval by the program director. Each student must write a capstone project report. Restricted to DEDP MASc students. S. Ellison

14.003 Microeconomic Theory and Public Policy
Subject meets with 14.03
Prereq: 14.01 or permission of instructor
G (Fall, Spring)
4-0-8 units
Applies microeconomic theory to analysis of public policy. Builds from microeconomic model of consumer behavior; extends to operation of single and multiple markets and analysis of why markets sometimes fail. Empirical examples to evaluate theory, focusing on the casual effects of policy interventions on economic outcomes. Topics include minimum wages and employment, food stamps and consumer welfare, economics of risk and safety regulation, the value of education, and gains from international trade. Graduate students are expected to complete additional assignments. Consult N. Agarwal, D. Autor, T. Salz

14.009 Economics and Society’s Toughest Problems
Prereq: None
U (Fall)
1-0-2 units
Should we trade more or less with China? Why are some countries poor, and some countries rich? Why are the 1% getting richer? Should the US have a universal basic income? Why is our society becoming so polarized? What can we do to mitigate climate change? Will robots take all the jobs? Why does racism persist and how can we fight it? What will the world economy look like after the COVID-19 recession? Economics shows you how to think about some of the toughest problems facing society -- and how to use data to get some answers. This exploratory course features lectures by MIT’s economics faculty, showing how their cutting-edge research can help answer these questions. Subject can count toward the 9-unit discovery-focused credit limit for first-year students. A. Banerjee, E. Duflo

14.01 Principles of Microeconomics
Prereq: None
U (Fall, Spring)
3-0-9 units. HASS-S
Introduces microeconomic concepts and analysis, supply and demand analysis, theories of the firm and individual behavior, competition and monopoly, and welfare economics. Applications to problems of current economic policy. J. Gruber, S. Ellison

14.02 Principles of Macroeconomics
Prereq: None
U (Fall, Spring)
3-0-9 units. HASS-S
Provides an overview of macroeconomic issues including the determination of national income, economic growth, unemployment, inflation, interest rates, and exchange rates. Introduces basic macroeconomic models and illustrates key principles through applications to the experience of the US and other economies. Explores a range of current policy debates, such as the economic effects of monetary and fiscal policy, the causes and consequences of the 2008 global financial crisis, and the factors that influence long-term growth in living standards. Lectures are recorded and available for students with scheduling conflicts. M. Beraja, R. Caballero

14.03 Microeconomic Theory and Public Policy
Subject meets with 14.003
Prereq: 14.01 or permission of instructor
U (Fall, Spring)
4-0-8 units. HASS-S
Applies microeconomic theory to analysis of public policy. Builds from microeconomic model of consumer behavior; extends to operation of single and multiple markets and analysis of why markets sometimes fail. Empirical examples to evaluate theory, focusing on the casual effects of policy interventions on economic outcomes. Topics include minimum wages and employment, food stamps and consumer welfare, economics of risk and safety regulation, the value of education, and gains from international trade. Consult N. Agarwal, D. Autor, T. Salz
14.04 Intermediate Microeconomic Theory
Prereq: Calculus II (GIR) and 14.01
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: U (Fall)
4-0-8 units. HASS-S

Analysis of consumer and producer decisions including analysis of competitive and monopolistic markets. Price-based partial and general equilibrium analysis. Introduction to game theory as a foundation for the strategic analysis of economic situations. Imperfect competition, dynamic games among firms. Failures of general equilibrium theory and their resolutions: externalities, public goods, incomplete information settings, signaling, screening, insurance, alternative market mechanisms, auctions, design of markets.
R. Townsend

14.05 Intermediate Macroeconomics
Prereq: 14.01 and (14.02 or permission of instructor)
U (Fall)
4-0-8 units. HASS-S

Uses the tools of macroeconomics to investigate various macroeconomic issues in depth. Topics range from economic growth and inequality in the long run to economic stability and financial crises in the short run. Surveys many economic models used today. Requires a substantial research paper on the economics of long-run economic growth.
Consult Department Headquarters

14.06 Advanced Macroeconomics
Prereq: 14.01 and 14.02
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: U (Spring)
4-0-8 units. HASS-S

Blends a thorough study of the theoretical foundations of modern macroeconomics with a review of useful mathematical tools, such as dynamic programming, optimal control, and dynamic systems. Develops comfort with formal macroeconomic reasoning and deepens understanding of key macroeconomic phenomena, such as business cycles. Goes on to study more specific topics, such as unemployment, financial crises, and the role of fiscal and monetary policy. Special attention to reviewing relevant facts and disentangling them from their popular interpretations. Uses insights and tools from game theory. Includes applications to recent and historical events.
G. M. Angeletos

14.07 Financial Markets and the Macroeconomy
Prereq: 14.01 and 14.02
U (Fall)
Not offered regularly; consult department
4-0-8 units. HASS-S

Analyzes the macroeconomic effects of financial markets, with emphasis on understanding financial crises. Surveys the benchmark theories of asset pricing, investment, and the capital structure. Topics include risk, arbitrage, financial market equilibrium, and market efficiency. Also introduces financial frictions, and analyzes the mechanisms by which frictions cause financial crises; focuses on asymmetric information, leverage, financial intermediation, belief disagreements, asset bubbles, fire sales, bank runs, interconnections, and complexity.
Consult Department Headquarters

14.08 Technical Topics in Economics
Prereq: 14.01
U (Fall, Spring)
4-0-8 units
Can be repeated for credit.

Considers technical issues of current research interest in economics.
Consult Department Headquarters

14.09 Reading Seminar in Economics
Prereq: 14.04 and 14.06
U (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Reading and discussion of particular topics in economics. Open to undergraduate students by arrangement with individual faculty members. Consult Department Headquarters.
D. Donaldson

14.10 Reading Seminar in Economics
Prereq: 14.04 and 14.06
U (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.

Reading and discussion of particular topics in economics. Open to undergraduate students by arrangement with individual faculty members. Consult Department Headquarters.
D. Donaldson


14.11 Topics in Economics
Prereq: 14.01
U (Fall)
Not offered regularly; consult department
4-0-8 units. HASS-S
Can be repeated for credit.
Considers issues of current research interest in economics. Consult Department Headquarters

14.12 Economic Applications of Game Theory
Prereq: 14.01 and (6.041B, 14.04, 14.30, 18.05, or permission of instructor)
U (Fall)
4-0-8 units. HASS-S
Analysis of strategic behavior in multi-person economic settings. Introduction to solution concepts, such as rationalizability, backwards induction, Nash equilibrium, subgame-perfect equilibrium, and sequential equilibrium. Strong emphasis on dynamic games, such as repeated games. Introduction to Bayesian games, focusing on Bayesian Nash Equilibrium, Perfect Bayesian Equilibrium, and signaling games. Applications drawn from microeconomics: imperfect competition, implicit cartels, bargaining, and auctions.
I. Ball

14.121 Microeconomic Theory I
Prereq: 14.04 and permission of instructor
G (Fall; first half of term)
3-0-3 units
Covers consumer and producer theory, markets and competition, general equilibrium and the welfare theorems; featuring applications, uncertainty, identification and restrictions models place on data. Enrollment limited; preference to PhD students.
P. Pathak

14.122 Microeconomic Theory II
Prereq: 14.121 and permission of instructor
G (Fall; second half of term)
3-0-3 units
Introduction to game theory. Topics include normal form and extensive form games, and games with incomplete information. Enrollment limited.
G. Ellison

14.123 Microeconomic Theory III
Prereq: 14.121, 14.122, and permission of instructor
G (Spring; first half of term)
3-0-3 units
Models of individual decision-making under certainty and uncertainty. Additional topics in game theory. Enrollment limited.
D. Fudenberg

14.124 Microeconomic Theory IV
Prereq: 14.123 or permission of instructor
G (Spring; second half of term)
3-0-3 units
Introduction to statistical decision theory, incentive contracting (moral hazard and adverse selection), mechanism design and incomplete contracting. Enrollment limited.
A. Wolitzky

14.125 Market Design
Prereq: 14.124
G (Spring)
4-0-8 units
Theory and practice of market design, building on ideas from microeconomics, game theory and mechanism design. Prominent case studies include auctions, labor markets, school choice, prediction markets, financial markets, and organ exchange clearinghouses.
P. Pathak

14.126 Game Theory
Prereq: 14.122
G (Spring)
3-0-9 units
Rigorous investigation of the evolutionary and epistemic foundations of solution concepts, such as rationalizability and Nash equilibrium. Covers classical topics, such as repeated games, bargaining, reputation, and supermodular games as well as new topics such as global games, heterogeneous priors, psychological games, and games without expected utility maximization. Applications provided when available.
D. Fudenberg, A. Wolitzky, M. Yildiz
14.127 Advanced Game Theory (New)
Prereq: None
G (Fall)
4-0-8 units

For students who plan to do game theory research. Covers the following topics: epistemic foundations of game theory, higher order beliefs, the role and status of common prior assumptions, social networks and social learning, repeated and stochastic games, non-equilibrium learning, stochastic stability and evolutionary dynamics, game theory experiments, and behavioral game theory.

D. Fudenberg, M. Yildiz

14.13 Psychology and Economics
Subject meets with 14.131
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S

Introduces the theoretical and empirical literature of behavioral economics. Examines important and systematic departures from the standard models in economics by incorporating insights from psychology and other social sciences. Covers theory and evidence on time, risk, and social preferences; beliefs and learning; emotions; limited attention; and frames, defaults, and nudges. Studies applications to many different areas, such as credit card debt, procrastination, retirement savings, addiction, portfolio choice, poverty, labor supply, happiness, and government policy. Students participate in surveys and experiments in class, review evidence from lab experiments, examine how the results can be integrated into models, and test models using field and lab data. Students taking graduate version complete additional assignments.

F. Schilbach

14.130 Reading Economic Theory
Prereq: 14.121 and 14.451
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: G (Fall)
2-0-10 units
Can be repeated for credit.

Class will read and discuss current research in economic theory with a focus on game theory, decision theory, and behavioral economics. Students will be expected to make one presentation and to read and post comments on every paper by the day before the paper is presented. Permission of the instructor required, and auditors are not allowed.

D. Fudenberg

14.131 Psychology and Economics
Subject meets with 14.13
Prereq: 14.01
G (Spring)
4-0-8 units

Introduces the theoretical and empirical literature of behavioral economics. Examines important and systematic departures from the standard models in economics by incorporating insights from psychology and other social sciences. Covers theory and evidence on time, risk, and social preferences; beliefs and learning; emotions; limited attention; and frames, defaults, and nudges. Studies applications to many different areas, such as credit card debt, procrastination, retirement savings, addiction, portfolio choice, poverty, labor supply, happiness, and government policy. Students participate in surveys and experiments in class, review evidence from lab experiments, examine how the results can be integrated into models, and test models using field and lab data. Students taking graduate version complete additional assignments.

F. Schilbach

14.137[J] Psychology and Economics
Same subject as 9.822[J]
Prereq: None
G (Spring)
4-0-8 units

Examines “psychology appreciation” for economics students. Aims to enhance knowledge and intuition about psychological processes in areas relevant to economics. Increases understanding of psychology as an experimental discipline, with its own distinct rules and style of argument. Topics include self-knowledge, cognitive dissonance, self-deception, emotions, social norms, self-control, learning, mental accounting, memory, individual and group behavior, and some personality and psycho-analytic models. Within each of these topics, we showcase effective and central experiments and discuss their role in the development of psychological theory. Term paper required.

F. Schilbach

14.147 Topics in Game Theory
Prereq: 14.126
G (Spring)
4-0-8 units

Advanced subject on topics of current research interest.

D. Fudenberg
DEPARTMENT OF ECONOMICS

14.15(Networks)
Same subject as 6.207
Subject meets with 14.150
Prereq: 6.041 or 14.30
U (Spring)
4-0-8 units. HASS-S

Highlights common principles that permeate the functioning of diverse technological, economic and social networks. Utilizes three sets of tools for analyzing networks—random graph models, optimization, and game theory—to study informational and learning cascades; economic and financial networks; social influence networks; formation of social groups; communication networks and the Internet; consensus and gossiping; spread and control of epidemics; control and use of energy networks; and biological networks. Students taking graduate version complete additional assignments.
A. Wolitzky

14.150 Networks (New)
Subject meets with 6.207, 14.15
Prereq: 6.041 or 14.30
G (Spring)
4-0-8 units

Highlights common principles that permeate the functioning of diverse technological, economic and social networks. Utilizes three sets of tools for analyzing networks—random graph models, optimization, and game theory—to study informational and learning cascades; economic and financial networks; social influence networks; formation of social groups; communication networks and the Internet; consensus and gossiping; spread and control of epidemics; control and use of energy networks; and biological networks. Students taking graduate version complete additional assignments.
A. Wolitzky

14.16(Strategy and Information)
Prereq: 14.01 or permission of instructor
U (Spring)
4-0-8 units. HASS-S

Covers modern applications of game theory where incomplete information plays an important role. Applications include bargaining, auctions, global games, market design, information design, and network economics.
M. Yildiz

14.160 Behavioral Economics
Prereq: 14.122
G (Spring)
4-0-8 units

Covers recent theory and empirical evidence in behavioral economics. Topics include deviations from the neoclassical model in terms of (i) preferences (present bias, reference dependence, social preferences), (ii) beliefs (overconfidence, projection bias), and (iii) decision-making (cognition, attention, framing, persuasion), as well as (iv) market reactions to such deviations. Applications will cover a large range of fields, including labor and public economics, industrial organization, health economics, finance, and development economics.
A. Banerjee, F. Schilbach

14.18 Mathematical Economic Modeling
Prereq: 14.04, 14.12, 14.15, or 14.19
U (Spring)
4-0-8 units. HASS-S

Guides students through the process of developing and analyzing formal economic models and effectively communicating their results. Topics include decision theory, game theory, voting, and matching. Instruction and practice in oral and written communication provided. Prior coursework in microeconomic theory and/or proof-based mathematics required.
Consult Department Headquarters

14.19 Market Design
Prereq: 14.01
U (Fall)
4-0-8 units. HASS-S

Covers the design and operation of organized markets, building on ideas from microeconomic and game theory. Topics may include mechanism design, auctions, matching markets, and other resource allocation problems.
P. Pathak

14.191 Independent Research Paper
Prereq: Permission of instructor
G (Fall, IAP, Spring, Summer)
0-12-0 units
Can be repeated for credit.

Under supervision of a faculty member approved by Graduate Registration Officer, student writes a substantial, probably publishable research paper. Must be completed by the end of a student’s second year to satisfy the departmental minor requirement.
Staff
14.192 Advanced Research and Communication
Prereq: 14.124, 14.382, and 14.454
G (Fall, IAP, Spring)
2-4-6 units
Can be repeated for credit.

Guides second-year Economics PhD students through the process of conducting and communicating economic research. Students choose topics for research projects, develop research strategies, carry out analyses, and write and present research papers. Limited to second year Economics PhD students.
Consult Department Headquarters

14.193 Advanced Seminar in Economics
Prereq: 14.121 and 14.451
G (Fall, Spring, Summer)
Units arranged
Can be repeated for credit.

Reading and discussion of current topics in economics. Open to advanced graduate students by arrangement with individual members of the staff.
Consult Department headquarters

14.195 Reading Seminar in Economics
Prereq: 14.121
G (Fall, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Reading and discussion of current topics in economics. Open to advanced graduate students by arrangement with individual members of the staff.
Staff

14.197 Independent Research
Prereq: None
G (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Under supervision of a faculty member approved by Graduate Registration Officer, student conducts independent research.
Staff

14.198, 14.199 Teaching Introductory Economics
Prereq: None
G (Fall, Spring)
2-0-2 units
Can be repeated for credit.

Required of teaching assistants in introductory economics (14.01 and 14.02), under supervision of the faculty member in charge of the subject.

14.281 Contract Economics
Prereq: 14.124
G (Fall)
4-0-8 units

Covers theoretical research on contracts in static as well as dynamic settings. Emphasis is on canonical models in contracting (agency theory, mechanism design, incomplete contracting) illustrated by major areas of application (e.g. compensation, labor and capital markets, property rights, organizational design, corporate finance).
I. Ball, S. Morris

Industrial Organization

14.20 Industrial Organization: Competitive Strategy and Public Policy
Subject meets with 14.200
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S

Analyzes the current debate over the rise of monopolies, the strategic behavior and performance of firms in imperfectly competitive markets, and the role of competition policy. Topics include monopoly power; pricing, product choice, and innovation decisions by firms in oligopoly markets; static and dynamic measurement of market performance; and incentives in organizations. Requires regular participation in class discussion and teamwork in a competitive strategy game. Students taking graduate version complete additional assignments.
N. Rose
14.200 Industrial Organization: Competitive Strategy and Public Policy
Subject meets with 14.20
Prereq: 14.01
G (Spring)
4-0-8 units
Analyzes the current debate over the rise of monopolies, the strategic behavior and performance of firms in imperfectly competitive markets, and the role of competition policy. Topics include monopoly power; pricing, product choice, and innovation decisions by firms in oligopoly markets; static and dynamic measurement of market performance; and incentives in organizations. Requires regular participation in class discussion and teamwork in a competitive strategy game. Students taking graduate version complete additional assignments.
N. Rose

14.27 Economics and E-Commerce
Prereq: 14.01 and (6.041 or 14.30)
U (Spring)
4-0-8 units. HASS-S
Uses theoretical economic models and empirical evidence to help understand the growth and future of e-commerce. Economic models help frame class discussions of, among other topics, content provision, privacy, piracy, sales taxation, group purchasing, price search, and advertising on the internet. Empirical project and paper required.
S. Ellison

14.271 Industrial Organization I
Prereq: None. Coreq: 14.122 and 14.381
G (Fall)
5-0-7 units
Covers theoretical and empirical work dealing with the structure, behavior, and performance of firms and markets and core issues in antitrust. Topics include: the organization of the firm, monopoly, price discrimination, oligopoly, and auctions. Theoretical and empirical work are integrated in each area.
G. Ellison, S. Ellison

14.272 Industrial Organization II
Prereq: 14.271
G (Spring)
5-0-7 units
Continuation of 14.271, which focuses on government interventions in monopoly and oligopoly markets, and addresses both competition and regulatory policy. Topics include horizontal merger policy and demand estimation, vertical integration and vertical restraints, and the theory and practice of economic regulation. Applications include the political economy of regulation; the performance of economic regulation; deregulation in sectors, including electric power, transportation, and financial services; and pharmaceutical and environmental regulation in imperfectly competitive product markets.
N. Rose, M. Whinston

14.273 Advanced Topics in Industrial Organization
Prereq: 14.271
G (Spring)
5-0-7 units
Empirical analysis of theoretically derived models of market behavior. Varied topics include demand estimation, differentiated products, production functions, analysis of market power, entry and exit, vertical relationships, auctions, matching markets, network externalities, dynamic oligopoly, moral hazard and adverse selection. Discussion will focus on methodological issues, including identification, estimation, counter-factual analysis and simulation techniques.
N. Agarwal, T. Salz

Organizational Economics

14.26[J] Organizational Economics
Same subject as 15.039[J]
Subject meets with 14.260
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S
Provides a rigorous, but not overly technical introduction to the economic theory of organization together with a varying set of applications. Addresses incentives, control, relationships, decision processes, and organizational culture and performance. Introduces selected fundamentals of game theory. Students taking graduate version complete additional assignments. Limited to 60.
C. Angelucci
14.260 Organizational Economics
Subject meets with 14.26[j], 15.039[j]
Prereq: None
G (Spring)
4-0-8 units
Provides a rigorous, but not overly technical introduction to the economic theory of organization together with a varying set of applications. Addresses incentives, control, relationships, decision processes, and organizational culture and performance. Introduces selected fundamentals of game theory. Students taking graduate version complete additional assignments. Limited to 60.

C. Angelucci

14.282 Introduction to Organizational Economics
Prereq: 14.124
G (Fall)
5-0-7 units
Begins with survey of contract theory for organizational economists, then introduces the main areas of the field, including the boundary of the firm; decision-making, employment, structures and processes in organizations; and organizations other than firms.

C. Angelucci, R. Gibbons

14.283 Advanced Topics in Organizational Economics I
Prereq: 14.282
G (Spring; first half of term)
2-0-4 units
Builds on the work done in 14.282 to develop more in-depth analysis of topics in the field.

R. Gibbons

14.284 Advanced Topics in Organizational Economics II
Prereq: 14.282
G (Spring; second half of term)
2-0-4 units
Builds on the work done in 14.282 to develop more in-depth analysis of topics in the field.

C. Angelucci

Statistics and Econometrics
14.30 Introduction to Statistical Methods in Economics
Subject meets with 14.300
Prereq: Calculus II (GIR)
U (Fall)
4-0-8 units. REST
Self-contained introduction to probability and statistics with applications in economics and the social sciences. Covers elements of probability theory, statistical estimation and inference, regression analysis, causal inference, and program evaluation. Couples methods with applications and with assignments involving data analysis. Uses basic calculus and matrix algebra. Students taking graduate version complete additional assignments. May not count toward HASS requirement.

A. Abadie

14.300 Introduction to Statistical Methods in Economics
Subject meets with 14.30
Prereq: Calculus II (GIR)
G (Fall)
4-0-8 units
Self-contained introduction to probability and statistics with applications in economics and the social sciences. Covers elements of probability theory, statistical estimation and inference, regression analysis, causal inference, and program evaluation. Couples methods with applications and with assignments involving data analysis. Uses basic calculus and matrix algebra. Students taking graduate version complete additional assignments.

A. Abadie

14.310 Data Analysis for Social Scientists
Prereq: None
G (Spring)
Not offered regularly; consult department
4-0-8 units
Introduces methods for harnessing data to answer questions of cultural, social, economic, and policy interest. Presents essential notions of probability and statistics. Covers techniques in modern data analysis: regression and econometrics, prediction, design of experiment, randomized control trials (and A/B testing), machine learning, data visualization, analysis of network data, and geographic information systems. Projects include analysis of data with a written description and interpretation of results; may involve gathering of original data or use of existing data sets. Applications drawn from real world examples and frontier research. Instruction in use of the statistical package R. Students taking graduate version complete additional assignments.

Consult E. Duflo
14.32 Econometric Data Science
Subject meets with 14.320
Prereq: 14.30
U (Fall, Spring)
4-4-4 units. Institute LAB

Introduces multiple regression methods for causal inference and descriptive analysis in economics and related disciplines. Extensions include instrumental variables methods, analysis of randomized experiments and quasi-experimental research designs, and regression with time series data. Develops the skills needed to conduct - and critique - empirical studies in economics and related fields. Students complete an empirical project with a written description and interpretation of results; this may involve original data collection or use of existing data sets. Applications drawn from real-world examples and frontier research. Familiarity with statistical programming languages is helpful. Students taking graduate version complete additional assignments.

A. Mikusheva, J. Angrist

14.320 Econometric Data Science
Subject meets with 14.32
Prereq: 14.300
G (Fall, Spring)
4-4-4 units

Introduces multiple regression methods for causal inference and descriptive analysis in economics and related disciplines. Extensions include instrumental variables methods, analysis of randomized experiments and quasi-experimental research designs, and regression with time series data. Develops the skills needed to conduct - and critique - empirical studies in economics and related fields. Students complete an empirical project with a written description and interpretation of results; this may involve original data collection or use of existing data sets. Applications drawn from real-world examples and frontier research. Familiarity with statistical programming languages is helpful. Students taking graduate version complete additional assignments.

A. Mikusheva, J. Angrist

14.33 Research and Communication in Economics: Topics, Methods, and Implementation
Prereq: 14.32 and (14.01 or 14.02)
U (Fall, Spring)
3-4-5 units. HASS-S

Exposes students to the process of conducting independent research in empirical economics and effectively communicating the results of the research. Emphasizes econometric analysis of an assigned economic question and culminates in each student choosing an original topic, performing appropriate analysis, and delivering oral and written project reports. Limited to 20 per section.

Staff

14.36 Advanced Econometrics
Subject meets with 14.387
Prereq: 14.32
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: U (Spring; first half of term)
2-0-4 units

Emphasizes econometric theory, methods, and applications using regression, instrumental variables, differences-in-differences, regression discontinuity designs, machine learning and big data sets, and problems related to standard errors and statistical inference. Includes a project with a theoretical, written and data-analytic component. Familiarity with Stata or a similar statistical programming language recommended. Students taking graduate version complete additional assignments.

J. Angrist

14.38 Inference on Causal and Structural Parameters Using ML and AI
Subject meets with 14.388
Prereq: 14.32
U (Spring)
4-0-8 units

Provides an applied treatment of modern causal inference with high-dimensional data, focusing on empirical economic problems encountered in academic research and the tech industry. Formulates problems in the languages of structural equation modeling and potential outcomes. Presents state-of-the-art approaches for inference on causal and structural parameters, including de-biased machine learning, synthetic control methods, and reinforcement learning. Introduces tools from machine learning and deep learning developed for prediction purposes, and discusses how to adapt them to learn causal parameters. Emphasizes the applied and practical perspectives. Requires knowledge of mathematical statistics and regression analysis and programming experience in R or Python.

V. Chernozhukov

14.380 Statistical Method in Economics
Prereq: Calculus II (GIR) and permission of instructor
G (Fall; first half of term)
3-0-3 units

Introduction to probability and statistics as background for advanced econometrics. Covers elements of probability theory, sampling theory, asymptotic approximations, hypothesis testing, and maximum-likelihood methods. Illustrations from economics and application of these concepts to economic problems. Limited to 40.

A. Mikusheva
14.381 Applied Econometrics
Prereq: 14.32 and (14.03 or 14.04)
G (Fall; second half of term)
3.0-3 units
Explains basic econometric ideas and methods, illustrating throughout with empirical applications. Cross-sectional causal inference is emphasized and examples of economic models are given. Topics include randomized trials, regression, instrumental variables, regression, discontinuity designs, and diff-in-diffs. Basic asymptotic theory for regression is studied and problems related to standard errors and statistical inference are resolved. No listeners.
W. Newey

14.382 Econometrics
Prereq: 14.381 or permission of instructor
G (Spring)
5.0-7 units
Covers key models as well as identification and estimation methods used in modern econometrics. Presents modern ways to set up problems and do better estimation and inference than the current empirical practice. Introduces generalized method of moments and the method of M-estimators in addition to more modern versions of these methods dealing with important issues, such as weak identification or biases arising in high dimensions. Also discusses the bootstrap and explores very high dimensional formulations, or “big data.” Students gain practical experience by applying the methods to real data sets. Enrollment limited.
V. Chernozhukov

14.384 Time Series Analysis
Prereq: 14.382 or permission of instructor
G (Fall)
5.0-7 units
Studies theory and application of time series methods in econometrics, including spectral analysis, estimation with stationary and non-stationary processes, VARs, factor models, unit roots, cointegration, estimation of DSGE models, and Bayesian methods. Enrollment limited.
A. Mikusheva

14.385 Nonlinear Econometric Analysis
Prereq: 14.382 or permission of instructor
G (Fall)
5.0-7 units
Develops a full understanding of and ability to apply microeconometric models and methods. Topics include extremum estimators, including minimum distance and simulated moments, identification, partial identification, sensitivity analysis, many weak instruments, nonlinear panel data, de-biased machine learning, discrete choice models, nonparametric estimation, quantile regression, and treatment effects. Methods are illustrated with economic applications. Enrollment limited.
A. Abadie, W. Newey

14.386 New Econometric Methods
Prereq: 14.382
G (Spring)
4.0-8 units
Focuses on recent developments in econometrics, especially structural estimation. Topics include nonseparable models, models of imperfect competition, auction models, duration models, and nonlinear panel data. Results illustrated with economic applications.
A. Abadie, W. Newey

14.387 Applied Econometrics
Subject meets with 14.36
Prereq: 14.382
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: G (Spring; first half of term)
2.0-4 units
Emphasizes econometric theory, methods, and applications using regression, instrumental variables, differences-in-differences, regression discontinuity designs, machine learning and big data sets, and problems related to standard errors and statistical inference. Includes a project with a theoretical, written and data-analytic component. Students taking graduate version complete additional assignments.
J. Angrist
14.388 Inference on Causal and Structural Parameters Using ML and AI
Subject meets with 14.38
Prereq: 14.381
G (Spring)
4-0-8 units
Provides an applied treatment of modern causal inference with high-dimensional data, focusing on empirical economic problems encountered in academic research and the tech industry. Formulates problems in the languages of structural equation modeling and potential outcomes. Presents state-of-the-art approaches for inference on causal and structural parameters, including de-biased machine learning, synthetic control methods, and reinforcement learning. Introduces tools from machine learning and deep learning developed for prediction purposes, and discusses how to adapt them to learn causal parameters. Emphasizes the applied and practical perspectives. Requires knowledge of mathematical statistics and regression analysis and programming experience in R or Python.
V. Chernozhukov

14.391 Workshop in Economic Research
Prereq: 14.124 and 14.454
G (Fall)
2-0-10 units
Can be repeated for credit.
Develops research ability of students through intensive discussion of dissertation research as it proceeds, individual or group research projects, and critical appraisal of current reported research. Workshops divided into various fields, depending on interest and size.
Staff

14.392 Workshop in Economic Research
Prereq: 14.124 and 14.454
G (Spring)
2-0-10 units
Can be repeated for credit.
Develops research ability of students through intensive discussion of dissertation research as it proceeds, individual or group research projects, and critical appraisal of current reported research. Workshops divided into various fields, depending on interest and size.
Staff

14.399 Seminar in Data Economics and Development Policy
Prereq: Permission of instructor
G (Spring)
2-0-10 units
Group study of current topics in development policy and research. Includes student presentations and invited speakers. Restricted to DEDP MASc students.
S. Ellison

National Income and Finance

14.41 Public Finance and Public Policy
Subject meets with 14.410
Prereq: 14.01
U (Fall)
4-0-8 units. HASS-S
Explores the role of government in the economy, applying tools of basic microeconomics to answer important policy questions such as government response to global warming, school choice by K-12 students, Social Security versus private retirement savings accounts, government versus private health insurance, setting income tax rates for individuals and corporations. Students taking the graduate version complete additional assignments.
J. Gruber

14.410 Public Finance and Public Policy
Subject meets with 14.41
Prereq: 14.01
G (Fall)
4-0-8 units
Explores the role of government in the economy, applying tools of basic microeconomics to answer important policy questions such as government response to global warming, school choice by K-12 students, Social Security versus private retirement savings accounts, government versus private health insurance, setting income tax rates for individuals and corporations. Students taking the graduate version complete additional assignments.
J. Gruber

Same subject as 15.470[J]
Prereq: None
G (Fall)
4-0-8 units
See description under subject 15.470[J].
L. Kogan, L. Schmidt
14.42 Environmental Policy and Economics
Subject meets with 14.420
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S

Investigates the proper role of government in the regulation of the environment. Presents tools necessary to estimate the costs and benefits of a variety of environmental policies. Focuses on both conceptual thinking and quantitative evaluation of environmental issues. Gives particular attention to climate change: defines the major concepts underlying the climate problem; examines the measurement of climate damages as well as the costs of mitigating them; and discusses the various policy options available to communities, countries, and international coalitions. Completion of 14.30 or equivalent statistics subject strongly recommended. Students taking graduate version complete additional assignments. Consult Department Headquarters

14.420 Environmental Policy and Economics
Subject meets with 14.42
Prereq: 14.01
G (Spring)
4-0-8 units

Investigates the proper role of government in the regulation of the environment. Presents tools necessary to estimate the costs and benefits of a variety of environmental policies. Focuses on both conceptual thinking and quantitative evaluation of environmental issues. Gives particular attention to climate change: defines the major concepts underlying the climate problem; examines the measurement of climate damages as well as the costs of mitigating them; and discusses the various policy options available to communities, countries, and international coalitions. Completion of 14.30 or equivalent statistics subject strongly recommended. Students taking graduate version complete additional assignments. Consult Department Headquarters

14.43[J] Economics of Energy, Innovation, and Sustainability
Same subject as 15.0201[J]
Prereq: 14.01 or 15.0111
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: U (Fall)
3-0-9 units. HASS-S
Credit cannot also be received for 15.020

See description under subject 15.0201[J].
J. Li

Same subject as 15.037[J]
Prereq: 14.01 or 15.0111
U (Spring)
4-0-8 units. HASS-S
Credit cannot also be received for 14.444[J], 15.038[J]

Analyzes business and public policy issues in energy markets and in the environmental markets to which they are closely tied. Examines the economic determinants of industry structure and evolution of competition among firms in these industries. Investigates successful and unsuccessful strategies for entering new markets and competing in existing markets. Industries studied include oil, natural gas, coal, electricity, and transportation. Topics include climate change and environmental policy, the role of speculation in energy markets, the political economy of energy policies, and market power and antitrust. Two team-based simulation games, representing the world oil market and a deregulated electricity market, act to cement the concepts covered in lecture. Students taking graduate version complete additional assignments. Limited to 60.
C. Knittel

14.440[J] Advanced Corporate Finance
Same subject as 15.473[J]
Prereq: None
G (Spring)
3-0-9 units

D. Thesmar, A. Schoar

14.441[J] Corporate Finance
Same subject as 15.471[J]
Prereq: None
G (Spring)
3-0-9 units

See description under subject 15.471[J].
A. Schoar, D. Thesmar

Same subject as 15.472[J]
Prereq: None
G (Fall)
3-0-9 units

J. Parker
Same subject as 15.038[J]
Prereq: 14.01 or 15.0111
G (Spring)
4-0-8 units
Credit cannot also be received for 14.44[J], 15.037[J]
Theoretical and empirical perspectives on individual and industrial
demand for energy, energy supply, energy markets, and public
policies affecting energy markets. Discusses aspects of the oil,
natural gas, electricity, and nuclear power sectors. Examines energy
tax, price regulation, deregulation, energy efficiency and policies
for controlling pollution and CO$_2$ emissions. Students taking the
graduate version complete additional assignments. Limited to 60.
C. Knittel

14.448[J] Current Topics in Finance
Same subject as 15.474[J]
Prereq: None
G (Spring)
3-0-9 units
Can be repeated for credit.
See description under subject 15.474[J]. Primarily for doctoral
students in accounting, economics, and finance.
Staff

Same subject as 15.475[J]
Prereq: Permission of instructor
G (Fall, Spring)
3-0-3 units
Can be repeated for credit.
See description under subject 15.475[J]. Restricted to doctoral
students.
A. Verdelhan

14.451 Dynamic Optimization Methods with Applications
Prereq: 14.06 and permission of instructor
G (Fall; first half of term)
3-0-3 units
Provides an introduction to dynamic optimization methods,
including discrete-time dynamic programming in non-stochastic and
stochastic environments, and continuous time methods including
the Pontryagin maximum principle. Applications may include the
Ramsey model, irreversible investment models, and consumption
choices under uncertainty. Enrollment limited.
C. Wolf

14.452 Economic Growth
Prereq: 14.451 and permission of instructor
G (Fall; second half of term)
3-0-3 units
Introduces the sources and modeling of economic growth and
income differences across nations. Topics include an introduction to
dynamic general equilibrium theory, the neoclassical growth model,
overlapping generations, determinants of technological progress,
endogenous growth models, measurement of technological
progress, the role of human capital in economic growth, and growth
in a global economy. Enrollment limited.
D. Acemoglu

14.453 Economic Fluctuations
Prereq: 14.452 and permission of instructor
G (Spring; first half of term)
3-0-3 units
Investigation of why aggregate economic activity fluctuates, and
the role of policy in affecting fluctuations. Topics include the link
between monetary policy and output, the economic cost of aggregate
fluctuations, the costs and benefits of price stability, and the role of
central banks. Introduction to real business cycle and new Keynesian
models. Enrollment limited.
I. Werning

14.454 Economic Crises
Prereq: 14.453 and permission of instructor
G (Spring; second half of term)
3-0-3 units
Provides an overview of models of the business cycle caused by
financial markets’ frictions and shocks. Topics include credit crunch,
collateral shocks, bank runs, contagion, speculative bubbles, credit
booms, leverage, safe asset shortages, capital flows and sudden
stops. Enrollment limited.
R. Caballero

14.461 Advanced Macroeconomics I
Prereq: 14.122 and 14.452
G (Fall)
5-0-7 units
Advanced subject in macrorconomics that seeks to bring students
to the research frontier. Topics vary from year to year, covering
a wide spectrum of classical and recent research. Topics may
include business cycles, optimal monetary and tax policy, monetary
economics, banking, and financial constraints on investment and
incomplete markets.
M. Beraja, I. Werning
14.462 Advanced Macroeconomics II
Prereq: 14.461
G (Spring)
5.0-7 units
Topics vary from year to year. Often includes coordination failures; frictions in beliefs, such as rational inattention, higher-order uncertainty, certain forms of bounded rationality, heterogeneous beliefs, and ambiguity; implications for business cycles, asset markets, and policy; financial frictions and obstacles to trade; intermediation; liquidity; safe assets; global imbalances; financial crises; and speculation.
Consult Department Headquarters

14.475 Environmental Economics
Prereq: None
G (Spring)
4.0-8 units
Discusses theory and evidence on environmental externalities and regulatory, tax, and other government responses to problems of market failure. Topics include cost-benefit analysis; measurement of the benefits of non-market goods; evaluation of the impacts of regulation; and international environmental issues, including the economics of climate change and trade and the environment.
C. Balboni

14.471 Public Economics I
Prereq: 14.04
G (Spring)
4.0-8 units
Theory and evidence on government taxation policy. Topics include tax incidence; optimal tax theory; the effect of taxation on labor supply and savings; taxation and corporate behavior; and tax expenditure policy.
J. Poterba, I. Werning

14.472 Public Economics II
Prereq: 14.471
G (Fall)
3.0-9 units
Focuses on government expenditures and policies designed to correct market failures and/or redistribute resources. Key topics include theoretical and empirical analysis of insurance market failures, the optimal design of social insurance programs, and the design of redistributive programs.
A. Finkelstein

14.475 International Economics I
Prereq: 14.04
G (Fall)
5.0-7 units
Covers a variety of topics, both theoretical and empirical, in international trade, international macroeconomics, and economic geography. Focuses on general equilibrium analysis in neoclassical economies. Considers why countries and regions trade, and what goods they trade; impediments to trade, and why some countries deliberately erect policy to impede; and implications of openness for growth. Also tackles normative issues, such as whether trade openness is beneficial, whether there are winners and losers from trade and, if so, how they can possibly be identified.
A. Costinot, D. Donaldson

14.54 International Trade
Prereq: 14.01
U (Fall)
4.0-8 units. HASS-S
Provides an introduction to theoretical and empirical topics in international trade. Offers a brief history of globalization. Introduces the theory of comparative advantage and discusses its implications for international specialization and wage inequality. Studies the determinants and consequences of trade policy, and analyzes the consequences of immigration and foreign direct investment.
A. Costinot

14.581 International Economics I
Prereq: 14.04
G (Fall)
5.0-7 units
Covers a variety of topics, both theoretical and empirical, in international trade, international macroeconomics, and economic geography. Focuses on general equilibrium analysis in neoclassical economies. Considers why countries and regions trade, and what goods they trade; impediments to trade, and why some countries deliberately erect policy to impede; and implications of openness for growth. Also tackles normative issues, such as whether trade openness is beneficial, whether there are winners and losers from trade and, if so, how they can possibly be identified.
A. Costinot, D. Donaldson
14.582 International Economics II  
Prereq: 14.06  
G (Spring)  
5-0-7 units  

Building on topics covered in 14.581, revisits a number of core questions in international trade, international macroeconomics, and economic geography in the presence of increasing returns, imperfect competition, and other distortions. Stresses their connection to both macro and micro (firm-level) data for questions related to trade policy, inequality, industrial policy, growth, and the location of economic activities. Focuses on both theoretical models, empirical findings, and the challenging task of putting those two together.  
D. Atkin, A. Costinot

Labor Economics and Industrial Relations

14.64 Labor Economics and Public Policy  
Subject meets with 14.640  
Prereq: 14.30 or permission of instructor  
Acad Year 2021-2022: U (Fall)  
Acad Year 2022-2023: Not offered  
4-0-8 units. HASS-S  

Provides an introduction to the labor market, how it functions, and the important role it plays in people's lives. Topics include supply and demand, minimum wages, labor market effects of social insurance and welfare programs, the collective bargaining relationship, discrimination, human capital, and unemployment. Completion of or concurrent enrollment in 14.03 or 14.04 recommended. Students taking graduate version complete additional assignments.  
J. Angrist

14.661 Labor Economics I  
Subject meets with 14.661A  
Prereq: 14.32 and (14.03 or 14.04)  
G (Fall)  
5-0-7 units  

A systematic development of the theory of labor supply, labor demand, and human capital. Topics include wage and employment determination, turnover, search, immigration, unemployment, equalizing differences, and institutions in the labor market. Particular emphasis on the interaction between theoretical and empirical modeling. No listeners.  
D. Acemoglu, J. Angrist, P. Pathak

14.661A Labor Economics I  
Subject meets with 14.661  
Prereq: 14.32 and (14.03 or 14.04)  
G (Fall)  
5-0-7 units  

Covers the same material as 14.661 but in greater depth. Additional assignments required. Limited to economics PhD students who wish to declare a major field in labor economics.  
D. Acemoglu, J. Angrist, P. Pathak

14.662 Labor Economics II  
Subject meets with 14.662A  
Prereq: 14.32 and (14.03 or 14.04)  
G (Spring)  
5-0-7 units  

Theory and evidence on the determinants of earnings levels, inequality, intergenerational mobility, skill demands, and employment structure. Particular focus on the determinants of worker- and firm-level productivity; and the roles played by supply, demand, institutions, technology and trade in the evolving distribution of income.  
D. Autor, S. Jaeger

14.662A Labor Economics II  
Subject meets with 14.662  
Prereq: 14.32 and (14.03 or 14.04)  
G (Spring)  
5-0-7 units  

Covers the same material as 14.662 but in greater depth. Additional assignments required. Limited to economics PhD students who wish to declare a major field in labor economics.  
D. Autor, S. Jaeger
**Economic History**

**14.70[J] Medieval Economic History in Comparative Perspective**
Same subject as 21H.134[J]
Prereq: None
U (Fall)
3-0-9 units. HASS-S; CI-H
See description under subject 21H.134[J].
A. McCants

**14.73 The Challenge of World Poverty**
Prereq: None
U (Fall)
4-0-8 units. HASS-S; CI-H
Designed for students who are interested in the challenge posed by massive and persistent world poverty. Examines extreme poverty over time to see if it is no longer a threat, why some countries grow fast and others fall further behind, if growth or foreign aid help the poor, what we can do about corruption, if markets or NGOs should be left to deal with poverty, where to intervene, and how to deal with the disease burden and improve schools.
E. Duflo, F. Schilbach

**Economic Development**

**14.74 Foundations of Development Policy**
Subject meets with 14.740
Prereq: 14.01
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: U (Fall)
4-0-8 units. HASS-S
Explores the foundations of policy making in developing countries, with the goal of spelling out various policy options and quantifying the trade-offs between them. Topics include education, health, fertility, adoption of technological innovations, financial markets (credit, savings, and insurance), markets for land and labor, political factors, and international considerations (aid, trade, and multinational firms). Some basic familiarity with probability and/or statistics is useful for this class. Students taking graduate version complete additional assignments.
A. Banerjee, B. Olken

**14.740 Foundations of Development Policy**
Subject meets with 14.74
Prereq: 14.01
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: G (Fall)
4-0-8 units
Explores the foundations of policy making in developing countries, with the goal of spelling out various policy options and quantifying the trade-offs between them. Topics include education, health, fertility, adoption of technological innovations, financial markets (credit, savings, and insurance), markets for land and labor, political factors, and international considerations (aid, trade, and multinational firms). Some basic familiarity with probability and/or statistics is useful for this class. Students taking graduate version complete additional assignments.
Consult Department Headquarters

**14.75 Political Economy and Economic Development**
Subject meets with 14.750
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S
Explores the relationship between political institutions and economic development, covering key theoretical issues as well as recent empirical evidence. Topics include corruption, voting, vote buying, the media, and war. Discusses not just what we know on these topics, but how we know it, covering how to craft a good empirical study or field experiment and how to discriminate between reliable and unreliable evidence. Some basic familiarity with probability and/or statistics is useful for this class. Students taking graduate version complete additional assignments.
A. Banerjee, B. Olken

**14.750 Political Economy and Economic Development**
Subject meets with 14.75
Prereq: 14.01
G (Spring)
4-0-8 units
Explores the relationship between political institutions and economic development, covering key theoretical issues as well as recent empirical evidence. Topics include corruption, voting, vote buying, the media, and war. Discusses not just what we know on these topics, but how we know it, covering how to craft a good empirical study or field experiment and how to discriminate between reliable and unreliable evidence. Some basic familiarity with probability and/or statistics is useful for this class. Students taking graduate version complete additional assignments.
A. Banerjee, B. Olken
14.76 Firms, Markets, Trade and Growth
Subject meets with 14.760
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S
Examines how industrial development and international trade have brought about rapid growth and large-scale reductions in poverty for some developing countries, while globalization has simply increased inequality and brought little growth for others. Also considers why, in yet other developing countries, firms remain small-scale and have not integrated with global supply chains. Draws on both theoretical models and empirical evidence to better understand the reasons for these very different experiences and implications for policy. Students taking graduate version complete additional assignments.
D. Atkin, D. Donaldson

14.760 Firms, Markets, Trade and Growth
Subject meets with 14.76
Prereq: 14.01
G (Spring)
4-0-8 units
Examines how industrial development and international trade have brought about rapid growth and large-scale reductions in poverty for some developing countries, while globalization has simply increased inequality and brought little growth for others. Also considers why, in yet other developing countries, firms remain small-scale and have not integrated with global supply chains. Draws on both theoretical models and empirical evidence to better understand the reasons for these very different experiences and implications for policy. Students taking graduate version complete additional assignments.
D. Atkin, D. Donaldson

14.771 Development Economics: Microeconomic Issues
Prereq: 14.121 and 14.122
G (Fall)
5-0-7 units
A rigorous introduction to core micro-economic issues in economic development, focusing on both key theoretical contributions and empirical applications to understand both why some countries are poor and on how markets function differently in poor economies. Topics include human capital (education and health); labor markets; credit markets; land markets; firms; and the role of the public sector.
E. Duflo, B. Oiiken

14.772 Development Economics: Macroeconomics
Prereq: 14.121 and 14.451
G (Spring)
5-0-7 units
Dynamic models of growth and development emphasizing migration, modernization, risk and finance, and technological change; static and dynamic models of political economy; the dynamics of income distribution and institutional change; SME and larger firm structure in developing countries; development, transparency, and information systems; and functioning of financial markets and institutions in emerging markets, their design and regulation.
D. Atkins, A. Banerjee, R. Townsend

14.773 Political Economy: Institutions and Development
Prereq: 14.121 and 14.451
Acad Year 2021-2022: Not offered
Acad Year 2022-2023: G (Spring)
5-0-7 units
Economists and policymakers increasingly realize the importance of political institutions in shaping economic performance, especially in the context of understanding economic development. Work on the determinants of economic policies and institutions is in its infancy, but is growing rapidly. Subject provides an introduction to this area. Topics covered: the economic role of institutions; the effects of social conflict and class conflict on economic development; political economic determinants of macro policies; political development; theories of income distribution and distributional conflict; the efficiency effects of distributional conflict; the causes and consequences of corruption; the role of colonial history; and others. Both theoretical and empirical approaches discussed. Subject can be taken either as part of the Development Economics or the Positive Political Economy fields.
D. Acemoglu, A. Banerjee
14.781[J] Political Economy I: Theories of the State and the Economy
Same subject as 15.678[J], 17.100[J]
Prereq: Permission of instructor
G (Fall)
3-0-9 units
See description under subject 17.100[J].
Consult B. Schneider

14.THG Graduate Thesis
Prereq: Permission of instructor
G (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.
Program of research and writing of thesis; to be arranged by the student with supervising committee.
Staff

14.THU Thesis
Prereq: 14.33
U (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.
Program of research and writing of thesis.
Staff

14.UR Undergraduate Research
Prereq: 14.02
U (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.
Participation in research with an individual faculty member or research group, independent research or study under the guidance of a faculty member. Admission by arrangement with individual faculty member.
Consult D. Donaldson

14.URG Undergraduate Research
Prereq: 14.02
U (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.
Participation in research with an individual faculty member or research group, independent research or study under the guidance of a faculty member. Admission by arrangement with individual faculty member.
Consult D. Donaldson