DEPARTMENT OF ECONOMICS

Economics is the study of all those aspects of individual and social activities related to the choice, production, distribution, and consumption of goods and services. In relation to these decisions, economics is concerned with the behavior and interaction of individuals, private firms, and other institutions and government agencies. Economics contributes to the understanding of many important social problems: changes in efficiency and productivity, fluctuations in the overall levels of economic activity and employment, inflation, the effects of government deficits, the growth and decline of industries, changes in foreign exchange rates, increases in international indebtedness, and the behavior of the centrally planned and less developed countries.

Subjects are offered in the major areas of economics: theoretical and applied analysis at the levels of the individual consumer, the firm, and the industry, as well as aggregate economic activity, industrial organization and health economics, econometrics, public finance, energy economics, labor economics, game theory, international trade and finance, economic history, economic development, and political economy.

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), combines training in technical economics with opportunities for a broad and balanced undergraduate education. Students may choose from a diversified group of 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 modern economic theory and a basic understanding of economic processes; to provide a descriptive knowledge of the US and world economies; and to develop in students the capabilities for quantitative analysis and independent thought. These aims correspond roughly to the requirements in the Course 14-1 program of theory, electives, statistics and econometrics, and research.

The requirements allow substantial freedom for students in designing individual programs within economics and balancing the programs with subjects in other disciplines. The large amount of unrestricted elective time encourages students to shape programs close to their own needs and interests. Students may select programs that concentrate on economics and other social sciences or may combine economics with other fields. They may emphasize the relation of economics and technology by choosing their free electives in engineering and science, or they may combine their studies in economics with subjects in history and the other humanities.

The successful completion of the degree program prepares students for further study in economics or for careers in business administration and finance, consulting, law and related fields, and public policy.

Although there are several satisfactory alternative subject sequences, students who by the end of their second year have taken 14.01 Principles of Microeconomics and 14.02 Principles of Macroeconomics can follow a program that permits considerable depth in electives in their third and fourth years. With that preparation, students can complete an intermediate micro subject, 14.05 Intermediate Macroeconomics or 14.18 Mathematical Economic Modeling, 14.30 Introduction to Statistical Methods in Economics, and 14.32 Econometrics in the third year. This program 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. The department strongly recommends that students take additional subjects in mathematics if professionally interested in economics.

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 than that provided by the SB in Economics, and allows them to concentrate in a subset of economics subjects, typically those more oriented toward microeconomics or technical subjects. Course 14-2 majors will gain the strong mathematical and theoretical preparation needed for subsequent graduate study in economics. This program is well suited to students interested in game theory, other types of microeconomic theory, and econometrics.

Students majoring in Mathematical Economics are required to successfully complete the most important introductory courses in economics before undertaking more technical and mathematical studies in economics. Substantial coursework in mathematics is required, including 18.100x Real Analysis, a choice between 18.06 Linear Algebra or 18.03 Differential Equations, and at least one elective in mathematics.

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:

Tier I
14.01 Principles of Microeconomics ¹ 12
14.02 Principles of Macroeconomics ¹ 12
14.30 Introduction to Statistical Methods in Economics 12
or 18.05 Introduction to Probability and Statistics

Tier II
Select one of the following: 12
14.03 Microeconomic Theory and Public Policy
14.04 Intermediate Microeconomic Theory
14.05 Intermediate Macroeconomics

Tier III
Select two elective subjects in applied economics. ² 24

Total Units 72

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 (http://economics.mit.edu/under/minors) for a list of available subjects.

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

Doctor of Philosophy
A candidate for the doctorate must demonstrate a mastery of economic theory, including both microeconomics and macroeconomics, and four other fields of study; achieve a specified level of competence in econometrics; submit and defend a dissertation that represents a contribution to knowledge; and be in residence for a minimum of two years. Two of the four fields, including economic theory, are covered by the written General Examination. Two minor fields may each be satisfied by one year of coursework. The four major and minor elective fields may be chosen from advanced economic theory, econometrics, economic development, finance, industrial organization, international economics, labor economics, monetary economics, organizational economics, political economy, and public economics.

There is no required minimum number of graduate subjects in the department. However, candidates ordinarily need two full academic years of study to prepare adequately for the General Examinations and to meet the other pre-thesis requirements. The doctoral thesis must be written in residence, which typically requires three years of research.

Financial Support
A limited number of students are supported by scholarship and fellowship grants, as well as by teaching and research assistantships. Typically, the assistantships are available only to students who have passed their general examinations, but in special circumstances research assistantships may be held by second-year students.

Inquiries
For more information regarding admissions or financial aid, contact Eva Konomi (evako@mit.edu), 617-253-8787. For undergraduate admissions and academic programs, contact Gary King (gking@mit.edu), 617-253-0951. For any other information, contact Kara Nemergut (nemergut@mit.edu), 617-253-3807.

Faculty and Teaching Staff
Glenn Ellison, PhD
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Professor of Economics
Head, Department of Economics

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Ford Professor
Professor of Economics
Associate Head, Department of Economics

Professors
Alberto Abadie, PhD
Professor of Economics
Member, Institute for Data, Systems, and Society

Daron Acemoglu, PhD
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Professor of Economics
Member, Institute for Data, Systems, and Society

George-Marios Angeletos, PhD
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Joshua Angrist, PhD
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Professor of Economics
Alexander Greenberg Wolitzky, PhD
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Assistant Professor of Economics

Isaiah Andrews, PhD
Silverman (1968) Family Career Development Professor
Assistant Professor of Economics

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Assistant Professor of Economics

Frank Schilbach, PhD
Assistant Professor of Economics

Visiting Associate Professors
Robin McKnight, PhD
Visiting Associate Professor of Economics

Casey Rothschild, PhD
Visiting Associate Professor of Economics

Visiting Assistant Professors
Camilo García-Jimeno, PhD
Hal Varian Visiting Professor of Economics

Sara Heller, PhD
Visiting Assistant Professor of Economics

Michal Kolesár, PhD
Visiting Assistant Professor of Economics

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

Visiting Lecturers
Sari Pekkala Kerr, PhD
Visiting Lecturer in Economics

Professors Emeriti
Olivier Jean Blanchard, PhD
Professor Emeritus of Economics

Richard S. Eckaus, PhD
Professor Emeritus of Economics

Stanley Fischer, PhD
Professor Emeritus of Economics

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

Paul L. Joskow, PhD
Professor Emeritus of 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
Professor Emeritus of Economics

General Economics and Theory

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.
Fall: D. Autor
Spring: S. Kerr
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. Taught in two formats - lecture/recitation and recitation only - each with 3 sessions per week. Same content and exams.
Fall: C. Rothschild
Spring: J. Harris

14.02 Principles of Macroeconomics
Prereq: None
U (Fall, Spring)
3-0-9 units. HASS-S

Provides an overview of macroeconomic issues: the determination of output, employment, unemployment, interest rates, and inflation. Monetary and fiscal policies are discussed. Important current policy debates such as the sub-prime crisis, social security, the public debt, and international economic issues are critically explored. Introduces basic models of macroeconomics and illustrates principles with the experience of the US and foreign economies. Taught in two formats - lecture/recitation and recitation only - each with 3 sessions per week. Same content and exams.
Fall: R. Caballero
Spring: J. Poterba

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.
Fall: D. Autor
Spring: S. Kerr

14.04 Intermediate Microeconomic Theory
Prereq: 14.01, Calculus II (GIR)
U (Spring)
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.
J. Toikka

14.05 Intermediate Macroeconomics
Prereq: 14.01, 14.02
U (Spring)
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.
A. Simsek

14.06 Advanced Macroeconomics
Prereq: 14.01, 14.02
U (Fall)
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
14.08 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, 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.
A. Mikusheva

14.10 Reading Seminar in Economics
Prereq: 14.04, 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.
A. Mikusheva

14.11 Topics in Economics
Prereq: 14.01
U (Fall)
4-0-8 units. HASS-S
Can be repeated for credit.

Considers issues of current research interest in economics.
S. Heller

14.12 Economic Applications of Game Theory
Prereq: 14.01; 6.041B 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, with a strong emphasis on the assumptions behind these solution concepts. Issues of incomplete information, such as signaling and reputation formation. Applications drawn from microeconomics and political economy.
M. Yildiz

14.121 Microeconomic Theory I
Prereq: 14.04, permission of instructor
G (Fall; first half of term)
3-0-3 units
Covers consumer and producer theory, uncertainty, and markets and competition. Studies the tools of comparative statics and their application to price theory. Enrollment limited; preference to PhD students.
A. Wolitzky

14.122 Microeconomic Theory II
Prereq: 14.121, 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, permission of instructor
G (Spring)
3-0-3 units
General equilibrium theory, a framework linking together micro and macroeconomics, and economic science. Covers Walrasian equilibrium (existence and computation, first and second welfare theorems); general implementation (the core, Nash bargaining, strategic market games); the representative consumer and Gorman aggregation; measurement and the organization of data; and calibration and econometric identification. Applications include uncertainty (risk sharing and financial markets); contracts and information economics; village economies and national development; models with money and credit; trade, spatial economics and differentiated commodities. Enrollment limited.
D. Fudenberg

14.124 Microeconomic Theory IV
Prereq: 14.123 or permission of instructor
G (Spring)
3-0-3 units
Introduction to statistical decision theory, incentive contracting (moral hazard and adverse selection), mechanism design and incomplete contracting. Enrollment limited.
B. Holmstrom
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, 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, M. Yildiz*

14.129 Advanced Contract Theory  
**Prereq:** 14.121, 14.281, or permission of instructor  
G (Spring; second half of term)  
3-0-3 units  
Recent developments in contract theory. Includes advanced models of moral hazard, adverse selection, mechanism design and incomplete contracts with applications to theory of the firm, organizational design, and financial structure.  
*Consult R. Townsend*

14.13 Economics and Psychology  
**Prereq:** 14.01  
U (Fall)  
4-0-8 units. HASS-S (HASS-E)  
Introduces the theoretical and empirical literature of behavioral economics. Examines important and systematic departures from the standard model in economics; covers intertemporal tradeoffs, risk preferences, social preferences, and intrinsic motivation; and applies theory to many different areas, such as credit card debt, addiction, portfolio choices, labor supply, and compensation policies of firms. Students review evidence from lab experiments, examine how the results can be integrated into models, and test models using field and lab data.  
*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.  
*D. Prelec*

14.147 Topics in Game Theory  
**Prereq:** 14.126  
G (Spring)  
4-0-8 units  
Advanced subject on topics of current research interest.  
*J. Toikka, M. Yildiz*

14.15[J] Networks  
Same subject as 6.207[J]  
**Prereq:** 6.041B or 14.30  
Acad Year 2016-2017: Not offered  
Acad Year 2017-2018: 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.  
*Consult Department Headquarters*
14.16 Strategy and Information
Prereq: 14.01 or permission of instructor
U (Spring)
4-0-8 units. HASS-S

Advanced course in game theory provides rigorous overview of equilibrium concepts for non-cooperative games in static and dynamic settings. Covers iterated strict dominance, rationalizability, Nash equilibrium, subgame perfection, sequential, perfect and proper equilibria, the intuitive criterion, and iterated weak dominance. Applications to auctions, bargaining, and repeated games. Introduces solution concepts for cooperative games and their non-cooperative implementations, as well as matching theory.

*M. Manea*

14.160 Behavioral Economics
Prereq: 14.122
G (Fall)
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 (New)
Prereq: 14.04, 14.12, 14.15[J], or 14.19
U (Fall)
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.

*A. Wolitzky*

14.19 Market Design
Prereq: 14.01
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: U (Spring)
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.

*Consult 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*

14.193 Advanced Seminar in Economics
Prereq: 14.121, 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.

*D. Fudenberg*

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.
14.198: J. Gruber, J. Harris
14.199: R. Caballero, J. Poterba

Industrial Organization

14.20 Industrial Organization and Competitive Strategy
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S
Analyzes the behavior and performance of firms in markets, with a particular focus on strategic interactions. Topics include monopoly power, behavior of firms in oligopoly markets, static and dynamic measurement of market performance, pricing and product choice decisions, advertising, research and development, and theory of the firm. Requires attendance and team participation in a Competitive Strategy Game.
N. Rose

14.21 Health Economics
Prereq: 14.01
U (Spring)
3-0-9 units. HASS-S
Applies theoretical and empirical tools of economics to problems of health and medical care delivery. Concentrates on selected topics such as decision-making under uncertainty, cost-benefit analysis, health insurance, physician remuneration, government regulation, health care systems of developing countries, and the economics of AIDS.
J. E. Harris

14.26 Economics of Incentives: Theory and Applications
Prereq: 14.01
U (Spring)
4-0-8 units. HASS-S
Provides a rigorous, but not overly technical introduction to the economic theory of incentives and organization together with a varying set of applications. These include, among others, the optimal design of sales and CEO incentive schemes; the impact of incentives on risk taking and innovation; tournament design; the analysis of venture capital and other forms of financial incentive contracts; relational and behavioral aspects of incentive contracts; and various organizational design problems.
B. Holmstrom

14.27 Economics and E-Commerce
Prereq: 14.01; 6.041B or 14.30
U (Fall)
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: 14.04
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

14.272 Industrial Organization II
Prereq: 14.271
G (Spring)
5-0-7 units
A continuation of 14.271. Topics covered include horizontal mergers and demand estimation, vertical integration and vertical restraints, natural monopoly and its regulation, public enterprise, political economy of regulation, network access pricing, deregulation of telecommunications, electric power, cable television, transportation sectors, and risk and environmental regulation.
N. Rose
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.
S. Ellison, W. Newey

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).
J. Toikka

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.
R. Gibbons, J. Van Reenen, M. Whinston

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.
J. Van Reenen

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 some economic applications. Elements of probability theory, sampling theory, statistical estimation, and hypothesis testing. Students taking graduate version complete additional assignments. May not count toward HASS requirement.
M. Manea

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 some economic applications. Elements of probability theory, sampling theory, statistical estimation, and hypothesis testing. Graduate students are expected to complete additional assignments.
M. Manea
14.31 Data Analysis for Social Scientists
Subject meets with 14.310
Prereq: Calculus I (GIR)
U (Spring)
4-0-8 units. Institute LAB

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 Stata. Students taking graduate version complete additional assignments.

D. Atkin, E. Duflo

14.310 Data Analysis for Social Scientists
Subject meets with 14.31
Prereq: None
G (Spring)
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 Stata. Students taking graduate version complete additional assignments.

D. Atkin, E. Duflo

14.32 Econometrics
Prereq: 14.30
U (Fall)
4-0-8 units

Introduction to econometric ideas and methods, emphasizing data analysis for empirical causal inference. Topics include randomized trials, regression, instrumental variables, differences-in-differences, and regression discontinuity designs. Emphasizes applications and includes problem sets. May not count toward HASS requirement.

A. Mikusheva

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

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.

S. Ellison

14.36 Advanced Econometrics
Subject meets with 14.387
Prereq: 14.32
U (Spring)
4-0-8 units

Covers a range of topics including duration models, discrete choice models, differentiated product models, count models and other advanced models that are used in a wide variety of applications in applied microeconomics, financial economics, and business economics. Mastery of one or more techniques taught in class demonstrated through the completion of an econometrics paper.

J. Angrist, V. Chernozhukov

14.381 Statistical Method in Economics
Prereq: Calculus II (GIR), permission of instructor
G (Fall)
5-0-7 units

Introduction to probability and statistics as background for advanced econometrics and introduction to the linear regression model. Covers elements of probability theory; sampling theory; asymptotic approximations; decision-theory approach to statistical estimation focusing on regression, hypothesis testing; and maximum-likelihood methods. Includes simple and multiple regression, estimation and hypothesis testing. Illustrations from economics and application of these concepts to economic problems. Enrollment limited.

I. Andrews, M. Kolesar

Department of Economics

13
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
Studies micro-econometric models, including large sample theory for estimation and hypothesis testing, generalized method of moments, estimation of censored and truncated specifications, quantile regression, structural estimation, nonparametric and semiparametric estimation, panel data, bootstrapping, and simulation methods. Methods illustrated with economic applications. Enrollment limited.
A. Abadie, I. Andrews

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.
M. Kolesar

14.387 Applied Econometrics
Prereq: 14.382 or 14.36
G (Spring)
4-0-8 units
Advanced treatment of core econometric ideas and methods. Emphasizes econometric theory and applications. Covers topics such as regression, instrumental variables, differences-in-differences, regression discontinuity designs, and problems related to standard errors and statistical inference. Includes problem sets with a theoretical and data-analytic component.
J. Angrist, V. Chernozhukov

14.389 Econometrics Paper
Prereq: 14.382 or 14.32
G (IAP)
0-0-3 units
Paper in econometrics required of all PhD candidates. Paper due at the end of IAP.
A. Abadie

14.391 Workshop in Economic Research
Prereq: 14.124, 14.454
G (Fall)
2-0-10 units
Can be repeated for credit.

14.392 Workshop in Economic Research
Prereq: 14.124, 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
National Income and Finance

14.41 Public Finance and Public Policy
Subject meets with 14.410
Prereq: 14.01
U (Spring)
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.
R. McKnight

14.410 Public Finance and Public Policy (New)
Subject meets with 14.41
Prereq: 14.01
G (Spring)
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.
R. McKnight

Same subject as 15.416[J]
Prereq: 14.121, 14.122
G (Fall)
4-0-8 units
See description under subject 15.416[J].
S. Ross

14.416 Public Finance and Public Policy
Subject meets with 14.41
Prereq: 14.01
U (Spring)
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.
R. McKnight

14.42 Environmental Policy and Economics
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.
S. Stolper

Same subject as 15.037[J]
Prereq: 14.01
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
Same subject as 15.440[J]
Prereq: 15.416[J]
G (Spring)
5-0-7 units
H. Chen, L. Kogan

Same subject as 15.441[J]
Prereq: 14.121, 14.122, or 15.416[J]
G (Spring)
3-0-9 units
See description under subject 15.441[J].
Staff

Same subject as 15.442[J]
Prereq: 14.382, 15.416[J], or permission of instructor
G (Fall)
3-0-9 units
See description under subject 15.442[J].
Staff

Same subject as 15.038[J]
Prereq: 14.01
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

14.451 Dynamic Optimization Methods with Applications
Prereq: 14.06, 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.
A. Simsek

14.452 Economic Growth
Prereq: 14.451, 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, 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.
G. M. Angeletos

14.454 Economic Crises
Prereq: 14.453, 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, 14.452  
G (Fall)  
5-0-7 units  
Advanced subject in macroeconomics 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.  
D. Acemoglu, I. Werning

14.462 Advanced Macroeconomics II  
Prereq: 14.461  
G (Spring)  
5-0-7 units  
Advanced topics on business cycles and crises; coordination problems; global games; DSGE models; financial frictions, micro founded macro models, analysis and design of financial systems.  
J. Parker, R. Townsend

14.471 Public Economics I  
Prereq: 14.04  
G (Fall)  
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 (Spring)  
3-0-9 units  
Theory and evidence on government expenditure policy and on regulatory and tax responses to problems of market failure. Focuses on social insurance programs such as social security and unemployment insurance, and on the causes and consequences of rising health expenditures.  
A. Finkelstein

14.473 Public Policy in Health Economics  
Prereq: 14.122  
G (Spring)  
4-0-8 units  
Theory and evidence on the economics of the health care sector, with a particular emphasis on the economics of technological change and innovation.  
H. Williams

International, Interregional, and Urban Economics

14.54 International Trade  
Prereq: 14.01, 14.02  
U (Fall)  
4-0-8 units. HASS-S  
Introduction to the theory of international trade and finance with applications to current policy issues.  
A. Costinot

14.581 International Economics I  
Prereq: 14.04  
G (Fall)  
5-0-7 units  
Theory of international trade and foreign investment with applications in commercial policy.  
D. Atkin, A. Costinot

14.582 International Economics II  
Prereq: 14.06  
G (Spring)  
5-0-7 units  
Covers international capital flows, exchange rate fluctuations, global capital markets, emerging markets, crises, sovereign debt, international financial architecture, and bubbles.  
A. Costinot
**Labor Economics and Industrial Relations**

**14.64 Labor Economics and Public Policy**
Prereq: 14.30 or permission of instructor  
Acad Year 2016-2017: U (Spring)  
Acad Year 2017-2018: 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 world-wide. 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.  
J. Angrist

**14.661 Labor Economics I**
Prereq: 14.04, 14.32  
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.  
D. Acemoglu, J. Angrist

**14.662 Labor Economics II**
Prereq: 14.04, 14.32  
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, H. Williams

**Economic History**

**14.70[J] Medieval Economic History in Comparative Perspective**
Same subject as 21H.134[J]  
Prereq: None  
U (Spring)  
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, 14.30  
U (Spring)  
4-0-8 units. HASS-S

**14.740 Foundations of Development Policy**
Subject meets with 14.74  
Prereq: 14.01, 14.30  
G (Spring)  
4-0-8 units

Explores the foundations of policy making in developing countries. Goal is to spell out various policy options and to quantify the trade-offs between them. Special emphasis on education, health, gender, fertility, adoption of technological innovation, and the markets for land, credit, and labor. Students taking the graduate version complete additional assignments.  
D. Atkin, E. Duflo

**14.75 Political Economy and Economic Development**
Prereq: 14.01, 14.30  
U (Fall)  
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, democracy, dictatorship, 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.  
B. Olken
14.770 Introduction to Collective Choice and Political Economy
Prereq: None
G (Fall)
4-0-8 units

Broad introduction to political economy. Covers topics from social choice theory to political agency models, including theories of voter turnout and comparison of political institutions.
A. Banerjee, C. Garcia-Jimeno

14.771 Development Economics: Microeconomic Issues
Prereq: 14.121, 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 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. Olken

14.772 Development Economics: Macroeconomics
Prereq: 14.121, 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.
A. Banerjee, R. Townsend

14.773 Political Economy: Institutions and Development
Prereq: 14.121, 14.451
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, C. Garcia-Jimeno

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 (Spring)
3-0-9 units

See description under subject 17.100[J].
M. Piore, S. Berger

14.999 Topics in Inequality
Prereq: 14.452
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Spring)
2-0-4 units

Addresses empirical and theoretical issues of inequality from various perspectives, such as macroeconomic, labor, public finance, and political economy.
Consult D. Autor

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.

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 A. Mikusheva