

ECONOMICS

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Courses given in Economics have the subject code ECON. For a complete list of subject codes, see Appendix B.

The department's purpose is to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them an ability to exercise judgment in evaluating public policy. There is training for the general student as well as for those who plan careers as economists in civil service, private enterprise, teaching, or research.

The undergraduate program provides an excellent background for those going on to graduate work in the professional schools (for example, business and law) and may also be structured to prepare students for a Ph.D. program in economics. The department's curriculum is an integral part of Stanford's programs in International Relations, Public Policy, and Urban Studies.

The primary objective of the graduate program is to educate students as research economists. In the process, students also acquire the background and skills necessary for careers as university teachers and as practitioners of economics. The curriculum includes a comprehensive treatment of modern theory and empirical techniques. Currently, 20 to 25 students are admitted each year.

The faculty represent a wide spectrum of interests and conduct research on a broad range of topics. Most fields of economics are covered, including behavioral economics, comparative institutional analysis, econometrics, economic development, economic history, experimental economics, industrial organization, international trade, labor, macro- and microeconomic theory, mathematical economics, and public finance.

UNDERGRADUATE PROGRAMS BACHELOR OF ARTS

The total number of units required for the major is 75. Students are encouraged to complete the core courses 1-5 below, as early as possible. Ideally, students should complete the core during the sophomore year,

before taking upper division courses. Courses may not be taken before the prerequisites are completed. The required number of field courses is four. There is great flexibility in the choice of electives, including upper-division math and statistics.

Of the 75 units required for the major, at least 50 must be taken at Stanford in California. Students cannot declare Economics as their major or minor until they have completed ECON 50 with a grade of 'B' or better.

REQUIREMENTS FOR THE ECONOMICS MAJOR (75 UNITS)

1. ECON 1 (5 units): principles of economics.
2. ECON 102A (5 units): introduction to statistical methods. It is recommended that students satisfy this basic statistics requirement before proceeding with the rest of the program. Prerequisite: MATH 41 or equivalent.
3. ECON 50 (5 units): basic price theory. Prerequisite: ECON 1 and 50M or MATH 51, or passed diagnostic test (administered at the beginning of ECON 50) on multi-variable calculus.
4. ECON 51 and 52 (10 units): intermediate micro- and macroeconomics. Prerequisite: ECON 50.
5. ECON 102B (5 units): econometrics. Prerequisites: ECON 50 and 102A. Material in ECON 102B is used in a number of field courses. Students are strongly advised to design their program of study so that ECON 102B is not taken in their senior year but early in their program.

Field Courses (must be taken at Stanford in California; 20 units)—Four courses must be chosen from among ECON 111, 118, 121, 140,* 141, 145, 149, 150, 154, 155, 156, 157, 160, 165 (5 units each).

Writing in the Major Course (5 units)—This requirement is fulfilled by ECON 101. This course should be taken only after completing ECON 51 and 52, 102B, and at least two field courses.

Electives (20 units)—Choose from Economics courses numbered from 100 through 198, excluding 190 and 191. Up to 10 units may be satisfied by MATH 52, 53, 103, 113, 114, 115; or STATS 200.

A maximum of 10 units of transfer credit or of ECON 139D, Directed Reading, may be taken under this section. Suitable transfer credit must be approved in writing by the Associate Director of Undergraduate Studies. Advanced undergraduate majors with strong quantitative preparation may enroll in graduate (200-level) courses with permission of the Director of Undergraduate Studies and the course instructor. Some courses offered by Overseas Studies may be counted towards this requirement. The department does not give credit for internships.

* Students may not count units from both ECON 135 and 140 towards their major as the courses are too similar in content.

OTHER REQUIREMENTS

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit, and 50 of the 75 units required for the major must be taken at Stanford in California.

Students with sufficiently high scores on the Advanced Placement Microeconomics and Macroeconomics tests can receive AP credit which enables them to fulfill the Economics major without taking ECON 1. However, these students nevertheless must take 75 units of economics courses to obtain the major: the AP credit does not yield any units toward the major.

A grade point average (GPA) of 2.0 (C) or better must be received for all units applied toward the preceding requirements.

To use transfer credit in partial satisfaction of the requirements, the student must obtain written consent from the department's Associate Director of Undergraduate Study, who establishes the amount of credit to be granted toward the department requirements (see the *Information Book for Economics Majors*). Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics major.

The time limit for satisfactory completion of a course is one year from the date an "incomplete" is given, although instructors may set a shorter time limit. Students are responsible for seeing that all grades of incomplete are cleared within the time limit.

SAMPLE PROGRAMS

Sample listings of upper-division economics electives may be examined in the department's *Information Book for Economics Majors*, available in the Economics Building, room 136. Sample programs are provided for the following areas of emphasis: (1) liberal arts, (2) pre-business, (3) quantitative, (4) international, (5) political economy and regulation, and (6) preparation for graduate school in economics.

MINORS

The minor in Economics has two main goals. The first is to acquaint students with the rudiments of micro- and macroeconomic theory that are required of all majors. The second is to allow students to build basic competence in the application of this theory to two fields of economics of their choosing, and the opportunity to specialize further in any one of these fields by taking one additional advanced course in the Department of Economics.

COURSE WORK

1. ECON 1 (5 units): principles of economics.
2. ECON 50 (5 units): basic price theory. Prerequisites: ECON 1 and 50M or MATH 51, or passed diagnostic test (administered at the beginning of ECON 50) on multi-variable calculus.
3. ECON 51 and 52 (10 units): intermediate micro- and macroeconomics. Prerequisite: ECON 50.
4. Two field courses (must be taken at Stanford in California; 10 units) may be chosen from the following list: ECON 102B, 111, 118, 121, 140,* 141, 145, 149, 150, 154, 155, 156, 157, 160, 165.
5. One elective (5 units) from Economics courses numbered 100 through 198, excluding 190 and 191.

* Students may not count units from both ECON 135 and 140 towards their major as the courses are too similar in content.

OTHER REQUIREMENTS

If the candidate's major requires basic Economics courses (items 1 through 3), then only half of the units from those courses apply toward the economics minor. To attain the overall 35 units required by the minor, the student must take additional Economics courses under items 4 and 5.

At least 20 out of the 35 units for the minor must be taken at Stanford. Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics minor.

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit. A grade point average (GPA) of 2.0 or better must be received for all units applied toward the minor.

Students must complete their declaration of the minor no later than the last day of the preceding quarter before their degree conferral.

HONORS PROGRAM

The honors program offers an opportunity for independent research, creativity, and achievement. It is designed to encourage a more intensive study of economics than is required for the normal major, with course and research work of exceptional quality. Honors students may participate in an Honors Research Symposium during Spring Quarter, with those nominated for prizes making oral presentations. The honors program requires:

1. Completing all requirements for the major.
2. Achieving a grade point average (GPA) of at least 3.5 for the 75 units required of the Economics major. See details in the *Information Book for Economics Majors*.
3. Complete ECON 102B and at least two lecture courses most relevant for the proposed topic of the honors thesis by the end of the junior year. (These can be included in the basic 75 units.)
4. Candidates must write an honors thesis in their senior year for at least one unit and up to 10 units of credit (ECON 199D). The thesis must be of very high quality and written under the direction of a member of the department or its affiliated faculty. Units of 199D do not count toward the course work requirements for the basic economics major, or in the computation of the GPA requirement for honors. Students

who take ECON 199D for 10 units may apply 5 of those units to meet the Writing in the Major (WIM) requirement. Such students complete the major with at least 80 units overall.

Juniors interested in the honors program should attend an informational meeting scheduled by the honors program director during the first week of each quarter. At this meeting, students receive information on organizing an honors project and are given details on honors programs. Prospective candidates for the honors program should submit an application to the director no later than the end of the first month of the third quarter before graduation (typically Autumn Quarter of the senior year). Also required, later in the same quarter, is a three-page thesis proposal that must be approved by the thesis adviser.

GRADUATE PROGRAMS

Graduate programs in economics are designed to ensure that students receive a thorough grounding in the methodology of theoretical and empirical economics, while at the same time providing specialized training in a wide variety of subfields and a broad understanding of associated institutional structures. Toward these ends, the program is arranged so that the student has little choice in the curriculum at the outset but considerable latitude later on.

Students admitted to graduate standing in the department are expected to have a strong background in college-level economics, mathematics, and statistics. Preparation ordinarily consists of a college major in economics, a year-long calculus sequence that includes multivariate analysis, a course in linear algebra, and a rigorous course in probability and statistics.

MASTER OF ARTS

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

The department does not admit students who plan to terminate their graduate study with the M.A. degree. Students may (but need not) elect this degree in preparation for the Ph.D. degree. A master's option is also available to Ph.D. candidates from other departments.

Admission—Prospective students must have completed the Stanford requirements for a B.A. in Economics or approximately equivalent training. Since students are required to take some of the same courses as Ph.D. candidates, similar preparation in mathematics and statistics generally is expected. Prospective applicants should submit their credentials together with a plan of study to the Director of Graduate Study for approval.

Requirements—A master's program must satisfy these criteria:

1. Completing, at Stanford, at least 45 units of credit beyond those required for the bachelor's degree, of which at least 40 units must be in the Department of Economics. Students must complete ECON 202 and at least three other 200-level courses. They must receive a grade of 'B-' or better in ECON 202. Undergraduate courses must be numbered 105 or higher. No seminar courses numbered 300 or above can be counted.
2. Demonstrating competence in empirical methodology by receiving a grade of 'B-' or better in both ECON 270 and 271, or by receiving a grade of 'B-' or above in each of ECON 102A, B, and C.
3. Submitting two term papers (or a thesis of sufficient quality). At least one of these papers must be deemed to represent graduate-level work. Normally, this means that it is written in connection with a 200-level course. A maximum of 10 units of credit can be earned for a thesis toward the 45-unit degree requirement.
4. A grade point average (GPA) of 3.0 must be maintained for all master's level work. All courses must be taken for a letter grade.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

Admitted students must be adequately prepared in calculus, linear algebra, and statistics (see above). When deemed appropriate, a student may be required to complete the necessary background preparation at Stanford. All students take a common core curriculum at the outset and later branch out into the desired fields of specialization. Well-prepared

students should anticipate spending, with some overlap, approximately two years in course work and another two years in seminars, independent study, and dissertation research. The goal is to complete the program in four years, although some types of research programs may require at least five years to complete. The department has a strong commitment to guiding students through the program expeditiously.

Questions and petitions concerning the program and the admissions process should be addressed to the Director of Graduate Study, who has responsibility for administering the graduate program.

Specific requirements are best discussed in two stages, the first consisting of requirements for admission to candidacy and the second involving further requirements for earning the degree.

Admission to Candidacy for Ph.D. — A student may apply for admission to candidacy when the following minimal requirements are met:

1. Successful results on comprehensive examinations in core economics (the examinations based on material from ECON 202, 203, 204; and 210, 211, 212), and econometrics (the examination based on material from ECON 270, 271, 272).
2. Completing the requirements in two additional fields of specialization from the list below or, if approved in advance by the Director of Graduate Study, in one such field together with a substantial amount of work toward a second field taught in a related department. Advanced fields include econometrics, economic development, economic history, industrial organization, international economics, labor economics, microeconomic theory, monetary theory and advanced macroeconomics, and public finance.

Each field listed above can be satisfied by completing two courses, although students in some fields may be advised to add a third course, which can then be counted toward the distribution requirement discussed later. All courses (or comprehensive exams, when offered) must be passed with a grade 'B' or better.

3. Completing a candidacy paper, normally written in conjunction with one of the special fields selected above.

It is expected that the student will meet, and indeed exceed, the above standard by the beginning of the third year of residency. When this is not possible for any reason, the Director of Graduate Study should be consulted as early as possible during the second year. Once it is deemed that the above standards have been met, the student should complete the Application for Candidacy for Degree of Doctor of Philosophy. After approval, candidacy remains valid for five years (although it can be terminated earlier by the department if progress is deficient); it can be renewed or extended beyond this period only under unusual circumstances.

Further Requirements for the Ph.D. Degree —

1. *Distribution Requirement:* Students must complete four other graduate-level courses meeting the following requirements:
 - a) at least one course from the area of economic history, unless history is one of the two fields of specialization.
 - b) courses in at least two fields other than the two fields of specialization. Distribution courses cannot be crosslisted in those fields.
 - c) with advance approval of the Director of Graduate Study, some of these distribution courses may be drawn from related fields taught in other departments. However, including courses taken to meet either the specialization or distribution requirements, no more than two courses in total may be taken outside the Economics department.
2. *Teaching Experience:* each student must serve as a teaching assistant for at least one quarter. It is strongly recommended that this requirement be satisfied before the final year of residence.
3. *Seminar Participation:* each student is expected to participate in at least two all-year research seminars by the end of the fourth year of residence. Normally, participation in a seminar requires one or more oral presentations and the submission of a research paper (which, however, need not be completely separate from dissertation research).
4. *Ph.D. Dissertation:* the process involves selecting a topic, choosing an appropriate adviser, submitting a prospectus (signed by the adviser) outlining the proposed research, selecting a three-member reading committee (usually all from the Department of Economics, although exceptions can be made under certain circumstances), passing the

University oral examination at which these three faculty (and two other members of the Academic Council) ask questions about the completed research, and submitting a final draft of the work signed by all members of the reading committee. The student is advised to initiate this process as early as possible.

PH.D MINOR

To be recommended for the Ph.D. degree with Economics as a minor subject, a student must qualify in three fields of economics, at least one of which must be in the core economics sequence. The standard of achievement in these fields is the same for minor as for major candidates, including the department's comprehensive examinations where appropriate.

JOINT DEGREE PROGRAMS WITH THE SCHOOL OF LAW

The Department of Economics and the School of Law offer a joint program leading to the Ph.D. in Economics and the J.D. degree in Law. See the Stanford University bulletin *Law School* for descriptions of its participation in the joint program.

To qualify, the student's program objectives must clearly justify such a joint program. Decisions are made by the Director of Graduate Study. A student's program in economics must satisfy the same standards as a Ph.D. degree in Economics taken with a minor in Law. It is expected that dissertation research will cross department lines and that members of the dissertation committee will be drawn from both faculties.

Students normally spend the first year full time either in Economics or in Law and the second year full-time in the other department. After the second year, courses in economics and law may be pursued simultaneously.

Other joint programs may be arranged; for example, the Ph.D. in Economics combined with one or two years of study in the School of Law, leading either to the nonprofessional Master of Legal Studies (M.L.S.) degree or the nonprofessional Master of Jurisprudence (J.M.). See the bulletin *Law School* for the requirements. Conversely, a student taking the J.D. in the School of Law may apply for an M.A. in Economics.

FELLOWSHIPS AND ASSISTANTSHIPS

The department awards a number of fellowships for graduate study. Many first-year and a few select second or third-year students are awarded full fellowships, including a stipend and tuition. All students whose records justify continuation in the program may be assured support for the second through fourth years in the form of employment as a teaching or research assistant. These half-time appointments provide a stipend and tuition allowance. Entering students are not normally eligible for research or teaching assistantships.

Applications should be submitted before January 1 to the department admissions committee.

COURSES

WIM indicates that the course satisfies the Writing in the Major requirements.

ECON 1. Elementary Economics — The economic way of thinking and the functioning of a modern market economy. The behavior of consumers and firms. Markets for goods and inputs. Analysis of macroeconomic variables: output, employment, inflation, interest rate. Determination of long-run growth and short-term fluctuations. The role of government: regulation, monetary, and fiscal policy. Limited enrollment. GER:DB-SocSci

5 units, Aut (Clerici-Arias), Win (Rangel), Spr (Stimel), Sum (Staff)

ECON 11N. Understanding the Welfare System — Stanford Introductory Seminar. Preference to freshmen. Welfare reform legislation and the devolution revolution. The transfer of responsibility for antipoverty programs to the states. How recent reforms change the welfare system and who is likely to be affected. Food stamps, AFDC, TANF, SSI, and Medicaid. Income transfer programs such as earned income tax credit and income taxes, and labor market regulations such as minimum wages and overtime rules. Economic principles to understand the effectiveness

of these programs and their consequences on the behavior of families. Pre- or corequisite: ECON 1. Recommended: basic understanding of labor markets, taxes, and transfers.

2 units, Aut (*MaCurdy*)

ECON 50. Economic Analysis I—Individual consumer and firm behavior under perfect competition. The role of markets and prices in a decentralized economy. Monopoly in partial equilibrium. Economic tools are developed from multi-variable calculus, using partial differentiation and techniques for constrained and unconstrained optimization. Prerequisites: 1, and 50M or MATH 51, or passed diagnostic test (administered at the beginning of ECON 50) on multivariable calculus. GER:DB-Math

5 units, Aut (*Tendall*), Win (*Abramitzky*)

ECON 50M. Mathematical Preparation for Economics—Preparation for 50 and 102A for students who either did not pass the diagnostic test administered at the beginning of 50 or who have not taken MATH 51. Elements of multi-variable calculus, constrained optimization, and matrix algebra. Prerequisites: 1 and MATH 41.

5 units, Aut (*Jacob*), Win (*Ahoobim*), Spr (*Asmundson*)

ECON 51. Economic Analysis II—Introduction to neoclassical analysis of general equilibrium, welfare economics, imperfect competition, externalities and public goods, intertemporal choice and asset markets, risk and uncertainty, game theory, adverse selection, and moral hazard. Multivariable calculus is used. Prerequisite: 50.

5 units, Win (*Tendall*), Spr (*Malaker*), Sum (*Staff*)

ECON 52. Economic Analysis III—Growth and fluctuations in the economic system as a whole. National income accounts and aggregate relationships among stocks and flows in markets for goods, labor, and financial assets. Economic growth, inflation, and unemployment. The role of macroeconomic policies in the short and long run. Prerequisite: 50.

5 units, Aut (*Tertilt*), Spr (*Klenow*), Sum (*Staff*)

ECON 90. Introduction to Financial Accounting—(Graduate students register for 190.) How to read, understand, and use corporate financial statements. Oriented towards the use of financial accounting information (rather than the preparer), and emphasizes the reconstruction of economic events from published accounting reports.

5 units, Aut (*Stanton*), Win (*Guttman*)

ECON 91. Introduction to Cost Accounting—(Graduate students register for 191.) The use of internal financial data for managerial decision making.

5 units, Spr (*Stanton*)

ECON 93Q. Global Capital Markets—Stanford Introductory Seminar. Preference to sophomores. Focus is on the operation of stock markets in the U.S.: the New York and American stock exchanges, and the over-the-counter NASDAQ market, on which high-tech companies are traded. Financial institutions in the U.S. (stock markets, mutual funds) and how they relate to international markets. Inflation, interest-rate trends, U.S. government agencies, and the impact of the Federal Reserve Bank on capital markets and capital flows. Macroeconomic factors that drive capital flows.

3 units, Win (*Marotta*)

ECON 101. Economic Policy Analysis—Economic policy analysis, writing, and oral presentation. Topics vary with instructor. Limited enrollment. Prerequisites: 51 and 52, 102B, and two field courses. Some sections require additional prerequisites. WIM

5 units, Aut (*Cojoc*, *Greif*), Win (*Gould*, *Clerici-Arias*, *Rothwell*), Spr (*Russell*, *Cojoc*, *Hansen*)

ECON 102A. Introduction to Statistical Methods (Postcalculus) for Social Scientists—Description and examples of the use of statistical techniques relevant to economics. Basic rules of probability, conditional probability, discrete and continuous probability distributions. Point estimation, tests of hypotheses, confidence intervals, and linear regression model. Prerequisite: MATH 41 or equivalent. GER:DB-Math

5 units, Aut, Win (*Stimel*)

ECON 102B. Introduction to Econometrics—Descriptive statistics. Regression analysis. Hypothesis testing. Analysis of variance. Heteroskedasticity, serial correlation, errors in variables, simultaneous equations. Prerequisites: 50, 102A or equivalent. Recommended: computer experience.

5 units, Win (*Ryu*), Spr (*Royalty*)

ECON 102C. Advanced Topics in Econometrics—Identification and estimation of the effect of human capital variables on earnings (e.g., the return to education, tenure), and identification and estimation of labor supply models, focusing on microeconomic data. Topics: instrumental variable estimation, limited dependent variable models (probit, logit, and tobit models), and panel data techniques (fixed effect and random effect models, dynamic panel data models).

5 units (*Pistaferrri*) not given 2005-06

ECON 103. Applied Econometrics—The construction and use of econometric models for analyzing economic phenomena. Students complete individual projects and core material. Topics vary with the instructor. Limited enrollment. Prerequisites: 52, 102B.

5 units, Spr (*Attanasio*)

ECON 106. World Food Economy—The interrelationships among food, populations, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on the public sector decision making as it relates to food policy.

5 units, Win (*Falcon*, *Naylor*)

ECON 111. Money and Banking—Money, interest rates, banks and other financial institutions at both micro and macro levels. Micro: alternative financial instruments, the determination of interest rates, the yield curve, and the role of banks and other capital market institutions in the intermediation process. Supply of money, regulation, and supervision. Macro: the choice of monetary policy by the central bank, the impact of monetary policy making institutions on this choice and the various channels through which monetary policy affects inflation and real variables in the economy. Emphasis is on the institutional structure of Federal Reserve System and the conduct of monetary policy in the U.S. Prerequisites: 50, 52.

5 units, Aut (*Gould*), Sum (*Staff*)

ECON 113. Technology and Economic Change—The economic causes and consequences of technological change. The historical experience of advanced industrial countries and the more recent experience of less developed economies. Topics: the origins of modern industry in the U.S. and Europe, technology and the growth of large-scale organizations, late-comers to industrialization (Japan and newly industrializing countries), economic growth and slowdown in mature industrial countries, and present concerns and future prospects (the influence of technology on employment, civilian spillover from military R&D, and coping with rapid technological change).

5 units, Spr (*Grandstrand*)

ECON 114. Economy and Economics of Ancient Greece—Introduction to the history of Greek civilization from the Mycenaean period to the 4th century B.C. The formalist-substantivist controversy: what behavioral assumptions should be made in order to understand the working of the Athenian economy. The economics and ethical thoughts of Plato and Aristotle in contrast to utilitarianism, which became a foundation of modern economics. Prerequisite: 1. GER:EC-GlobalCom

5 units, Aut (*Amemiya*)

ECON 115. European Economic History—Economic changes and growth in W. Europe from antiquity to the present. The transformation of Europe from an economically and culturally backward part of the world to the center of the world economy pre-WWI. Topics: the role of technics and sciences, variations of the extent of market activities, institutional changes, international politics, demography. GER:DB-SocSci

5 units (*Greif*) not given 2005-06

ECON 116. American Economic History—From colonial times to the present. The application of economic analysis to historical issues, and the role of historical context in economics. Topics: American economic growth in international perspective; the economics of slavery and regional divergence; the origins and consequence of the American system of technology and business organization; recent U.S. economic performance in historical perspective. Prerequisite: 1. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Wright)

ECON 117. Economic History and Modernization of the Islamic Middle East—From the rise of Islam to the present. Transformation of region from economically advanced to underdeveloped. Role of religion in economic successes and failures. Current obstacles to development. Topics: Islamic economic institutions; innovation and change; political economy of modernization; interactions with other regions; and economic consequences of Islamism.

5 units (Kuran) not given 2005-06

ECON 118. Development Economics—The economic problems and policy concerns of developing countries. Theories of growth and development; inequality and poverty; credit and labor markets; population growth and fertility choice; migration; sustainable development and globalization. Emphasis on economic models rather than case studies. Prerequisites: 50, 52, 102B. GER:EC-GlobalCom

5 units, Aut (Staff)

ECON 120. Socialist Economies in Transition—Privatization, restructuring, and institutional change in E. Europe and the former Soviet Union. Analysis of property rights, corporate governance, incentives, and resource allocation in socialist and transitional economies. Emphasis is on liberalization and privatization policies (including mass and voucher programs) as the primary instruments to induce changes in behavior. Prerequisite: 50. Recommended: 51.

5 units, Spr (Gathmann)

ECON 121. Development Economics, with Special Reference to East Asia—The macroeconomic aspects of economic development: structural transformation, resource utilization, mobilization, and allocation; the sources of economic growth; intersectoral transfers; the role of the external sector; money and finance in development; stabilization in closed and open economies; strategies for economic development; the role of intangible capital; and endogenous technical progress. Illustrations from the economic development experience of E. Asia, including Japan, China, Hong Kong, S. Korea, Singapore, Taiwan, Indonesia, Malaysia, Philippines, Thailand. Prerequisite: 52. GER:EC-GlobalCom

5 units (Staff) not given 2005-06

ECON 124. Contemporary Japanese Economy—The Japanese economy in comparative and historical perspective. Micro and institutional aspects, i.e., firms, the employment system, corporate governance and financial institutions, and the macro economy. Elementary applications of macro and micro economics. Prerequisite: 50. GER:EC-GlobalCom

5 units, Win (Aoki)

ECON 126. Economics of Health and Medical Care—(Graduate students register for 256; same as BIOMEDIN 156/256.) Graduate students with research interests should take ECON 248. Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: institutions in the health sector; measurement and valuation of health; nonmedical determinants of health; medical technology and technology assessment; demand for medical care and medical insurance; physicians, hospitals, and managed care; international comparisons. Prerequisite: ECON 50 and ECON 102A or equivalent statistics, or consent of instructor. Recommended: ECON 51.

5 units, Aut (Bhattacharya)

ECON 135. Finance I for Non-MBAs—(Same as FINANCE 221, MS&E 245G.) For graduate students and advanced undergraduates. The foundations of finance with applications in corporate finance and investment management. Major financial decisions made by corporate

managers and investors with focus on process valuation. Topics include criteria for investment decisions, valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the valuation of derivative securities. Major corporate financial instruments including debt, equity, and convertible securities. Equivalent to core MBA finance course, FINANCE 220. Prerequisites: 51, or ENGR 60, or equivalent; ability to use spreadsheets, and basic probability and statistics concepts including random variables, expected value, variance, covariance, and simple estimation and regression.

4 units, Win (Admati)

ECON 136. Auctions and Market Design—Competitive bidding for asset purchases and procurement of industrial needs; bidder entry decisions; design of mechanisms for complicated resource allocation problems. Prerequisites: 51, 160.

5 units, Win (Milgrom)

ECON 137. Information and Incentives—Incentives in situations where one part has more information than another. A part may have better information about things that it controls (moral hazard), or about things that are outside of its control (adverse selection). The general structure of incentive problems and the design of contracts and institutions to deal with such problems. Applications: executive and employee compensation, sharecropping, financial contracts and credit rationing, insurance, markets with unobservable quality, monopolistic price discrimination, regulation of natural monopolies, income taxation and redistribution, the provision of public goods, and auctions.

5 units (Staff) not given 2005-06

ECON 138. Risk and Insurance—Nature of economic risk and its effect on allocation of resources. Preferences among risky prospects: expected utility theory and the theory of risk aversion. Subjective versus objective probabilities. Market allocation of risk and the role of insurance markets under complete information. Insurance under asymmetric information, moral hazard, and adverse selection. Can insurance markets function well in a competitive equilibrium? Role of asset markets in allocating risk. How some risks corporations face are associated with price fluctuations and can be hedged in financial markets. How to set up hedging strategies using futures markets. Hedging strategies using options and other derivative assets. Hedging credit risks. Prerequisites: 51, 102A.

5 units, Aut (Kurz)

ECON 139D. Directed Reading

1-10 units, Aut, Win, Spr, Sum (Staff)

ECON 140. Introduction to Financial Economics—Modern portfolio theory and corporate finance. Topics: properties of various financial instruments including financial futures, mutual funds, the capital asset pricing model, and models for pricing options and other contingent claims. Prerequisites: 51, 102A.

5 units, Spr (Kurz), Sum (Staff)

ECON 141. Public Finance and Fiscal Policy—What role should and does government play in the economy? What are the effects of government expenditure, borrowing, and taxation? Policy topics: budget surpluses/deficits; tax reform; social security, public goods, and externalities; fiscal federalism; public investment; and cost-benefit analysis. Prerequisites: 51, 52.

5 units, Win (Cojoc)

ECON 142. The Political Economy of the Federal Budget—Tools of economic analysis; how the federal government makes budgetary decisions. Factors that have contributed to the growth in federal spending, taxation, and the national debt; congressional and executive branch budget processes and their effects on government policy making; spending programs including Social Security, Medicare, welfare, and infrastructure programs. Prerequisites: 50, 52; 52 may be taken concurrently.

5 units, Spr (Snowberg)

ECON 143. Ethics in Economics Policy—Ethical decision theory from an economist's viewpoint. Formulating objectives for economic policy. The role of markets in an economic system. Concepts of equity, efficiency,

and rights. Measuring economic performance. The benefits and costs of market liberalization. Prerequisites: 50, 51, and 102A.

5 units (Hammond) not given 2005-06

ECON 145. Labor Economics—Analysis and description of labor markets. Determination of employment, unemployment, hours of work, wages. Welfare programs and work effort. Wage differentials by schooling, experience, gender, and race. Economics of discrimination. Earnings inequality and changes in inequality. Employment contracts, labor unions, and bargaining. International comparisons. Prerequisites: 50, 102B. GER:EC-Gender

5 units, Win (Pencavel)

ECON 147. Economics of Human Resources—Investments in human capital including education, on-the-job training, government training, and health. The effects of human capital accumulation on wages and wage growth and on wage differentials by gender and race. Sample selections and experimental data. Poverty and inequality. Optional research project for public policy organization on labor market/human resources issues. Prerequisite: 51.

5 units, Win (Staff)

ECON 148. Urban Economics—Costs and benefits of cities, city location, land rent and land use, suburbanization, zoning, poverty, housing and segregation, homelessness, local government finance, transportation, schools, and crime. Prerequisites: 50, 102A.

5 units (Staff) not given 2005-06

ECON 149. Modern Firm in Theory and Practice—Theoretical and institutional analysis of modern corporate firms: industrial relational, motivational, financial, information structural, managerial, and legal. The role of various hybrid institutional forms between the market and the integrated firm: subcontracting, franchising, R&D cooperatives, and consortia. Practices in American, W. European, and Japanese firms. Prerequisite: 51.

5 units (Segal) not given 2005-06

ECON 150. Economic Policy Analysis—(Same as PUBLPOL 104.) The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50 and 102A.

5 units, Win (Noll)

ECON 152. Mass Media Economics and Policy—(Enroll in PUBLPOL 172.)

4-5 units (Owen) not given 2005-06

ECON 153. Economics of the Internet—Applications of microeconomic theory to Internet businesses: auctions, online transactions, entry barriers, valuation, pricing of facilities, policy for broadband communications, network economics, standards, economics of information. Prerequisites: 51 and one of 102B, 103, 104, 113, 135, 137, 140, 149, 157, or 160.

5 units, Aut (Hanson)

ECON 154. Economics of Legal Rules and Institutions—The design and consequences of legal rules. Common ideas that run through law including individual rationality, economic efficiency, conventional and Coasian analyses of externalities, enforcement, costs, and market consequences of legal restrictions on contract terms. Private versus public enforcement of law; the tradeoff between certainty and severity of punishment; the choice between ex post and ex ante sanctions; and the choice between property and liability rules. Applications to property, intellectual property, contract, criminal, tort, family, and environmental law. Prerequisite: 51.

5 units, Win (Owen)

ECON 155. Environmental Economics and Policy—(Same as EARTH-SYS 112.) Economic sources of environmental problems and alternative policies for dealing with them (technology standards, emissions taxes, and marketable pollution permits). Evaluation of policies addressing regional air pollution, global climate change, water allocation in the western U.S., and the use of renewable resources. Connections between population growth, economic output, environmental quality, and human welfare. Prerequisite: ECON 50. GER:DB-NatSci

5 units, Spr (Goulder)

ECON 157. Imperfect Competition—The interaction between firms and consumers in markets that fall outside the benchmark competitive model. How firms acquire and exploit market power. Game theory and information economics to analyze how firms interact strategically. Topics include monopoly, price discrimination, oligopoly, collusion and cartel behavior, anti-competitive practices, the role of information in markets, anti-trust policy, and e-commerce. Sources include theoretical models, real-world examples, and empirical papers. Prerequisite: 51.

5 units, Aut (Hussein)

ECON 158. Antitrust and Regulation—The history, economics, and legal background of the institutions under which U.S. industry is subject to government control. Topics: antitrust law and economics; the economics and practice of public utility regulation in the communications, transportation, and energy sectors; and the effects of licensing. Emphasis is on the application of economic concepts in evaluating the performance and policies of government agencies. Prerequisite: 51.

5 units, Spr (Rosston, Noll)

ECON 160. Game Theory and Economic Applications—Mathematical introduction to game theory and its applications to economics. Topics: strategic and extensive form games, Nash equilibrium, subgame-perfect equilibrium, Bayesian equilibrium, and perfect Bayesian equilibrium. The theory is applied to repeated games, auctions, and bargaining. Examples from economics and political science. Prerequisites: 51 and course in calculus, or consent of instructor.

5 units, Spr (Hammond)

ECON 162. Monetary Economics—Dynamic analysis of the role of money and monetary policy in the macro economy, using calculus. Topics: the exchange process and the role of money; inside and outside money; inflation and the inflation tax; international monetary systems; the indeterminacy of floating exchange rates; policies to fix the exchange rate and inflationary incentives; currency crises and speculative attacks; money and interest-bearing government debt; the government's budget constraint and the coordination of monetary and fiscal policies; hyper-inflations and stabilizations; the effect of the national debt on consumption, savings, investment and output; time consistency of government policies. Prerequisite: 52.

5 units (Staff) not given 2005-06

ECON 165. International Economics—Comparative advantage in production and trade among nations; trade policy; increasing returns, imperfect competition and trade; the international monetary mechanism; domestic monetary, fiscal, and exchange rate policies and their relationship to foreign trade; global financial crises and trade. Prerequisites: 1, 51, 52.

5 units, Spr (Hale), Sum (Staff)

ECON 167. European Monetary and Economic Integration—The economics of the European Community and the internal market. Analysis of current competition, transportation, and factor market policies, including the problems of agriculture and unemployment. Fiscal harmonization and mercantilist rivalry. European Monetary Union (EMU): genesis, implementation, and consequences of a common currency and central bank. Foreign exchange and foreign trade. Prerequisites: 51, 52, or equivalents.

5 units, Win (Schroeder)

ECON 168. Path Dependence and Economic Analysis—Historically contingent change in the economy; theoretical and applied research on path-dependent phenomena and their implications for economic policy. Topics: self organization in economics; relationships between micro level irreversibilities, branching processes, positive feedback dynamics and the generation of emergent properties at the macroeconomic level; non convexities, lock-in to suboptimal equilibria, and the economics of QWERTY. Historical antecedents and modern formalizations of historical economics, applications of paradigmatic models of non-ergodic stochastic processes. Case studies. Research papers required. Prerequisites: two upper-level economics courses in applied fields. Limited enrollment.

5 units (Staff) not given 2005-06

ECON 169. International Financial Markets and Monetary Institutions—(Graduate students register for 269.) How nations are linked financially through money, capital, and exchange markets, emphasizing policy issues including the role of the International Monetary Fund, monetary and exchange rate policy, prevention and resolution of financial crises in emerging markets, current account imbalances, and capital mobility. Development and use of macroeconomic models of international financial linkages and microeconomic models of hedging, optimal selection of currencies for invoice and trade credit, and parity relationships in futures, swaps, and options markets. Prerequisite: 165.

5 units, Win (Taylor)

ECON 170. Intermediate Econometrics I—(Graduate students register for 270.) Probability, random variables, and distributions; large sample theory; theory of estimation and hypothesis testing. Limited enrollment. Prerequisites: math and probability at the level of Chapter 2, Paul G. Hoel, *Introduction to Mathematical Statistics*, 5th ed.

2-5 units, Aut (Hansen, Mahajan)

ECON 171. Intermediate Econometrics II—(Graduate students register for 271.) Linear regression model, relaxation of classical-regression assumptions, simultaneous equation models, linear time series analysis. Limited enrollment. Prerequisite: 270.

5 units, Aut (Wolak)

ECON 172. Intermediate Econometrics III—(Graduate students register for 272.) Continuation of 271. Nonlinear estimation, qualitative response models, limited dependent variable (Tobit) models. Limited enrollment. Prerequisite: 271.

2-5 units, Win (MaCurdy)

ECON 178. Neuroeconomics—(Graduate students register for 278; same as PSYCH 278.) Techniques from neuroscience and psychology to study how the brain makes economic decisions; implications for the social sciences, especially economics and political science. Topics include: brain processes related to reward, control, and attention; role of emotion in decision making; morality; emotion in social encounters; bargaining and strategic thinking; decision making and probability assessment in risky situations; intertemporal decision making; and addiction. Prerequisite: graduate background in neuroscience or economics, or consent of instructor.

5 units (Rangel) not given 2005-06

ECON 179. Experimental Economics—Methods and major subject areas that have been addressed by laboratory experiments. Focus is on a series of experiments that build on one another. Topics include decision making, two player games, auctions, and market institutions. How experiments are used to learn about preferences and behavior, trust, fairness, and learning. Final presentation of group projects. Prerequisites: 50, 51, 102A.

5 units (Niederle) not given 2005-06

ECON 190. Introduction to Financial Accounting—(Same as 90; see 90.)

5 units, Aut (Stanton), Win (Guttman)

ECON 191. Introduction to Cost Accounting—(Same as 91; see 91.)

5 units, Spr (Stanton)

ECON 198. Junior Honors Seminar

5 units, Spr (Rothwell)

ECON 199D. Honors Thesis Research—In-depth study of an appropriate question and completion of a thesis of very high quality. Normally written under the direction of a member of the Department of Economics (or some closely related department). See description of honors program. Register for at least 1 unit for at least one quarter. Meets first week of Autumn Quarter (see *Stanford Daily* for details).

1-10 units, Aut, Win, Spr, Sum (Rothwell)

PRIMARYLY FOR GRADUATE STUDENTS

ECON 239D. Directed Reading

1-10 units, Aut, Win, Spr, Sum (Staff)

ECON 299. Practical Training—Students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program.

1-10 units, Aut, Win, Spr, Sum (Staff)

ECON 400. Ph.D. Dissertation

1-15 units, Spr (Staff)

A. CORE ECONOMICS

ECON 202. Core Economics: Modules 1 and 2 (Non-Economics graduate students register for 202N.) Open to advanced undergraduates with consent of instructors. Theory of the consumer and the implications of constrained maximization; uses of indirect utility and expenditure functions; theory of the producer, profit maximization, and cost minimization; behavior under uncertainty; partial equilibrium analysis and introduction to models of general equilibrium. Limited enrollment. Prerequisite: thorough understanding of the elements of multivariate calculus and linear algebra.

2-5 units, Aut (Levin, Segal)

ECON 202N. 202 For Non-Economics Ph.D. Students—Core Economics modules 1 and 2 for non-Economics Ph.D. students.

2-5 units, Aut (Mumford)

ECON 203. Core Economics: Modules 5 and 6—(Non-Economics graduate students register for 203N.) Non-cooperative game theory including normal and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities and public goods. The theory of imperfect competition: static Bertrand and Cournot competition, dynamic oligopoly, entry decisions, entry deterrence, strategic behavior to alter market conditions. Limited enrollment. Prerequisite: 202.

2-5 units, Win (Bernheim)

ECON 203N. 203 For Non-Economics Ph.D. Students

2-5 units (Staff) not given 2005-06

ECON 204. Core Economics: Modules 9 and 10—The theory of contracts, emphasizing contractual incompleteness and the problem of moral hazard. Incentive regulation. Competition with imperfect information, including signaling and adverse selection. The theory of resource allocation over time, competitive equilibrium, and intertemporal efficiency. Limited enrollment. Prerequisite: 203.

2-5 units, Spr (Milgrom)

ECON 210. Core Economics: Modules 3 and 7—Dynamic economics applied to aggregate economic fluctuations and economic growth. Solving dynamic, stochastic rational expectation models using discrete time dynamic programming. Growth theory (neoclassical models, growth accounting, technical change, endogenous growth) using optimal control theory. Limited enrollment.

2-5 units, Aut (Tertilt)

ECON 211. Core Economics: Modules 11 and 12—Capital asset pricing models, equilibrium with securities, pricing of securities, and arbitrage. Overlapping generations models with incomplete market structure and sunspots. Foundations of Bayesian dynamic learning. Investment theory and empirics, including adjustment costs and the q theory; consumption theory and empirics, focusing on the life-cycle model; and the labor market. Limited enrollment. Prerequisite: 210.

2-5 units, Win (Hall, Klenow)

ECON 212. Core Economics: Modules 4 and 8—Monetary theory: economic fluctuations, the role of money (overlapping generations, cash in advance, money in the utility function), dynamic impact of changes in money on the economy, natural rate of unemployment and job creation/destruction, exchange rate determination, international transmission of money, dynamic stochastic general equilibrium models. Macroeconomic policy: rationale for central bank independence, time inconsistency, the impact of public debt, rules versus discretion, interest rate versus money rules, international monetary policy coordination, rational expectations, econometric policy evaluation. Limited enrollment. Prerequisite: 203, 211.

2-5 units, Spr (Taylor)

ECON 301. Microeconomic Workshop

1-10 units, Aut, Win, Spr (Staff)

ECON 305. Economic Applications Workshop

1-10 units, Aut, Win, Spr (Staff)

ECON 310. Macroeconomic Workshop

1-10 units, Aut, Win, Spr (Staff)

B. ECONOMIC DEVELOPMENT

To receive credit for this field, students must complete 214 and 217, and submit a paper from one of these courses. Students wishing to do research in the field are advised to take courses in international economics, such as 266, and in comparative institutional analysis.

ECON 214. Development Economics: Microeconomic Issues—Microeconomic analysis of markets and institutions in developing countries. Topics: the role of the household; models of savings, credit, and risk; adjustment to aggregate shocks; occupational choice, credit constraints, and credit market imperfections; health and nutrition; new technology; and education. Emphasis is on empirical tests of and evidence for theoretical models.

2-5 units, Win (Tarozzi)

ECON 216. Development Economics and Growth: Macroeconomics—The historical experience of economic development; patterns of economic growth; sources of economic growth; models of economic development (two-gap models, dual economy models, open economy models, new growth models), savings and capital accumulation; the role of money and finance; inflation; taxation; stabilization in closed and open economies with incomplete and/or imperfect markets; human and other forms of intangible capital; infrastructural capital and externalities; income distribution; numerical general equilibrium models.

2-5 units, Aut (Attanasio)

ECON 217. Development Economics: Money and Finance—Banking systems, interest rates, regulatory policies, and the productivity of capital in developing countries. Controlling inflation: fiscal and monetary policies for macroeconomic stability. Currency crises, exchange rates, and the liberalization of foreign trade. Further applications to transitional socialist economies in Asia and E. Europe.

2-5 units (McKinnon) not given 2005-06

ECON 267. Special Topics in International Economics—The level and growth effects of trade and trade liberalization in neoclassical and endogenous growth models. The empirical evidence (country specific and cross country), on the effects of trade liberalization on growth, poverty, and inequality within and between countries. Implications for national and international policies. Multilateral versus preferential trade liberalization

including the Doha round of multilateral trade negotiations.

2-5 units, Win (Hale)

ECON 315. Development Workshop

1-10 units, Aut, Win, Spr (Staff)

C. ECONOMIC HISTORY/INSTITUTIONS

The requirement for the field is one research paper on a subject approved by one of the faculty teaching any of the following courses.

ECON 224. Science, Technology, and Economic Growth—Upper-division undergraduates may enroll with consent of instructor. The roles played by the growth of scientific knowledge and technical progress in the development of industrial societies. Emphasis is on the interactions between science and technology, and the organizational factors which have influenced their effectiveness in contributing to productivity growth.

2-5 units, Win (David)

ECON 226. U.S. Economic History—The American economy from colonial times to the present. The role of economic history as a distinctive intellectual approach to the study of economics. Topics: American growth record and its determinants, the origins and character of U.S. technology, slavery, the Great Depression, recent U.S. performance in historical perspective.

2-5 units, Spr (Wright)

ECON 228. Institutions and Organizations in Historical Perspective—Emphasis is on the formative period from the 11th to 18th centuries. Formation, function, and evolution of institutions; alternative conceptual frameworks such as neoclassical, transaction cost economics, institutionalism, and Marxism and neo-Marxism; game theory, mechanism design, and contract theory. Institutions related to trade organization, the organization of production, feudalism, mercantilism, and the state.

2-5 units, Aut (Greif)

ECON 325A,B,C. Economic History Workshop

1-10 units, Aut, Win, Spr (Staff)

D. MONETARY THEORY AND ADVANCED MACROECONOMICS

Requirements for this field are completion of 233 and 234.

ECON 233,234,235. Monetary Theory and Advanced Macroeconomics I/II/III—Topics in the theory of fluctuations and growth.

2-5 units, **233:** Win (Klenow), **234:** Spr (Hall),

235: (Klenow, Kocherlakota) not given 2005-06

E. PUBLIC FINANCE

To receive credit for the field, students must complete 241 and 242 by passing the final examinations, and submit an acceptable research paper on a topic approved by the instructor for either course. Students may take Public Finance as a field and still count 243 and/or 244 toward satisfying their distribution requirements.

ECON 241. Public Economics and Political Economy I: Public Policy—Welfare economics. Effects of tax policy, including incidence and efficiency costs. Design of tax systems. Externalities, public goods, and clubs. Cost-benefit analysis. Prerequisites: ECON 202-204, 210, 270, 271, or equivalent with consent of instructor.

2-5 units, Win (Bernheim)

ECON 242. Public Economics and Political Economy II: Public Institutions—Social insurance, comparative political institutions, and federalism. Prerequisites: 202, 203, 204, 210, 270, 271, or equivalent with consent of instructor. Recommended: 241.

2-5 units, Spr (Shoven)

ECON 243. Economics of Environment—Open to upper-division undergraduates with consent of instructor. Sources of environmental problems in market economies and policy options for addressing these problems. Topics: choice of policy instruments (taxes, standards, tradable permits),

environmental risk assessment, valuation of non-marketed commodities (environmental amenities, biodiversity), environmental policy making under uncertainty, the optimal mix of corrective and distortionary tax instruments, and the dynamics of economic growth in the presence of non-reproducible natural resources.

2-5 units, *Win (Goulder)*

ECON 244. Psychology and Economics—Experimental and field evidence related to the psychological mechanisms behind static choice, intertemporal choice, choice under risk and uncertainty, choice in social situations, and hedonics. Models of economic choice based on these findings, and how they improve the explanatory and predictive value of standard theories. Prerequisites: 204, 271, or consent of instructor.

2-5 units, *Spr (Rangel)*

ECON 341. Workshop on the Economics of the Public Sector—Issues in measuring and evaluating the economic performance of government tax, expenditure, debt, and other policies; their effects on private economic activity, saving, investment, labor supply; alternative policies and methods of evaluation. Workshop combines student research, faculty presentations, and guest speakers. Prerequisite: 241 or consent of instructor.

1-10 units, *Aut, Win, Spr (Staff)*

ECON 343. Workshop in Environmental and Natural Resources Economics—Economic analyses of environmental and natural resource problems and policies. Presentations by faculty and graduate students.

1-10 units, *Aut, Win, Spr (Staff)*

F. ECONOMICS OF LABOR

To receive credit for this field, students must complete two from 246, 247, and 248.

ECON 246. Labor Economics I—The demand for workers and hours of work, substitution among different types of labor in production, technological change, adjustment costs, restrictions on layoffs. The supply of labor, hours of work, participation, life-cycle models of behavior, welfare programs. Wage differentials by schooling, age, cohort, gender, and race. Changes in these wage differentials and differences across countries. Economics of discrimination. Employment contracts and turnover. Models of labor union behavior. Bargaining. Worker-owned enterprises. Unemployment and mobility. International comparisons.

2-5 units, *Aut (Pencavel)*

ECON 247. Labor Economics II—The economics and econometrics of program evaluation. The impact of public policies on labor demand, labor supply, human capital and wage determination. Social, natural, and quasi-experiments.

2-5 units, *Win (Pistaferrri)*

ECON 249. Personnel Economics—(Enroll in MGTECON 652.)

4 units (*Staff*)

ECON 345. Applications Workshop

1-10 units, *Aut, Win, Spr (Staff)*

G. ECONOMICS OF INDUSTRY

To receive credit for the field, students must complete 257 and 258 and submit one research paper, the subject of which has been approved in advance by one of the faculty teaching 257, 258, or 260.

ECON 250A. Natural Resource and Energy Economics—First part of two course sequence. Issues in provision and management of non-renewable and renewable natural resources, and energy products and services. Theory and empirical methods related to: market structure, pricing, and performance of important energy and resource industries; sources of market failure in these industries; and alternative regulatory approaches. Prerequisites: 202, 203, 204, 270, 271, and 272, or equivalents with consent of instructor.

2-5 units, *Aut (Goulder, Wolak)*

ECON 250B. Environmental Economics—Second of two course sequence. Sources of environmental problems in market economies; policy options for addressing these problems. Topics include: alternative environmental policy instruments such as taxes, standards, and tradable permits; valuation of non-marketed commodities such as environmental amenities and biodiversity; and environmental policy making under uncertainty. Applications include global climate change and green tax reform. Prerequisites: 202, 203, 204, 270, and 271, or equivalents with consent of the instructor.

2-5 units, *Win (Goulder, Wolak)*

ECON 256. Economics of Health and Medical Care—(Same as 156; see 156.)

5 units, *Aut (Bhattacharya)*

ECON 257,258. The Economics of Industry, Regulation, and Firm Organizations I/II—Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; price discrimination; price dispersion and consumer search; differentiated products; the role of information in markets, including insurance and adverse selection; auctions; collusion and cartel behavior; advertising; entry and market structure; market dynamics; strategic behavior.

2-5 units, **257:** *Aut (Levin, Einav)*, **258:** *Win (Noll, Wolak)*

ECON 260. Special Topics in Industrial Organization and Regulation—Current research and policy interest. Topics may include: empirical tests of oligopoly theories; non-price competition; entry and market structure; the role of information in markets; auctions; e-commerce; dynamics of change in regulatory policy; theory of economics institutions; antitrust status of joint ventures; and use of capacity, innovation, and product variety as a barrier to entry. Significant unresolved research issues and promising ways to attack them. Prerequisite: 257. Recommended: 258.

2-5 units, *Spr (Athey, Einav)*

ECON 355. Industrial Organization Workshop—Current research in the field by visitors, presentations by students, and discussion of recent papers. Students write an original research paper, make a formal presentation, and lead a structured discussion.

1-10 units, *Aut, Win, Spr (Staff)*

H. INTERNATIONAL ECONOMICS

To receive credit for this field, students must complete 266 and either 265 or 269, and submit a paper from one of these courses. All three courses are recommended. For students doing research in the field, further supporting courses are found in the fields of economic development, industrial organization, and public finance.

ECON 265. International Finance and Open Economy Macroeconomics—Monetary foundations of international exchange; the rules of the game. The world dollar standard. Hedging foreign exchange risk. International capital flows and the current account. Monetary and fiscal policies in open economies. Currency crises in developing economies and institutional reform; the IMF.

2-5 units, *Aut (McKinnon)*

ECON 266. International Trade—Determinants of trade and comparative advantage. Trade with imperfectly competitive markets. Income distribution and gains from trade. Commercial policies, tariffs, and quotas. Dynamic comparative advantage. Economic geography and trade. Political economy of trade.

2-5 units, *Spr (Srinivassan)*

ECON 269. International Financial Markets and Monetary Institutions—(Same as 169; see 169.)

5 units, *Win (Taylor)*

ECON 365. International Trade Workshop

1-10 units, *Aut, Win, Spr (Staff)*

I. ECONOMETRICS

A student may satisfy the requirements for the econometrics field by completing the requirements of one of two subfields:

I-1: Theoretical Econometrics: To receive credit in the theoretical econometrics subfield, students must complete 273A and 273B.

I-2: Applied Econometrics: To receive credit in the applied econometrics subfield, students must complete 273A and either 274 or 275. Students must also complete a course or set of courses that is empirically oriented. The last requirements must be approved by the Director of Graduate Study in consultation with the instructor of 274 or 275.

ECON 270. Intermediate Econometrics I—(Same as 170; see 170.)
2-5 units, Aut (Hansen, Mahajan)

ECON 271. Intermediate Econometrics II—(Same as 171; see 171.)
5 units, Aut (Wolak)

ECON 272. Intermediate Econometrics III—(Same as 172; see 172.)
2-5 units, Win (MaCurdy)

ECON 273A. Advanced Econometrics I—Parametric asymptotic theory. Large-sample properties of estimators defined as the solution to an optimization problem, under a variety of assumptions for the true data generation process. General large sample results for maximum likelihood, nonlinear least squares, nonlinear instrumental variables estimators, including the generalized method of moments estimator under general conditions. Asymptotic hypothesis testing procedures derived for each estimation framework.

2-5 units, Win (Wolak)

ECON 273B. Advanced Econometrics II—Simulations methods. Semiparametric and nonparametric methods. Optimal rate of convergence and semiparametric efficiency bounds. Prerequisite: 273A.

2-5 units, Spr (Mahajan)

ECON 274. Limited Dependent Variables—Discrete choice models; Tobit models; Markov chain and duration models. Prerequisite: 273 or consent of instructor.

2-5 units, Spr (Ryu)

ECON 275. Time Series and Simultaneous Equation—Stochastic processes in the time and frequency domain. Time and frequency domain estimation. Unit roots, co-integration, time-varying conditional second moment models, instrumental variables estimation of dynamic models.

2-5 units, Win (Hansen)

ECON 276. Advanced Econometrics—Possible topics: robust estimation, stochastic control, prediction theory, Bayesian analysis, factor analysis, pooling of time series and cross section data. Prerequisite: 273A, B.

2-5 units (Staff) not given 2005-06

ECON 370. Econometrics Workshop
1-10 units, Aut, Win, Spr (Staff)

J. MICROECONOMIC THEORY

To receive credit for this field, students must complete two courses in one of the following two subfields:

J-1: General Theory: 280, 281, 284, 286, 287

J-2: Decisions, Contracts and Incentives: 282, 283, 286, 289

Note: taking one course from each track does not satisfy the microeconomic theory field requirement.

ECON 278. Neuroeconomics—(Same as 178, see 178.)
5 units (Rangel) not given 2005-06

ECON 279. Experimental Economics—An introduction to experimental economics, its methods, and major subject areas that have been addressed by laboratory experiments. Focus is on a series of experiments that build on one another, and allow researchers with different theoretical dispositions to narrow the range of potential disagreement. Prerequisites: 202, 203, 204, or consent of instructor.

2-5 units (Niederle) not given 2005-06

ECON 280. Welfare Economics—Social choice theory with and without interpersonal comparisons; Pareto efficiency with public goods, externalities, and non-convexities; potential Pareto improvements. Private information, incentive constraints, and mechanism design. Welfare measurement, cost benefit analysis, and analysis of economic policy reform.

2-5 units (Staff) not given 2005-06

ECON 281. Normative Decision Theory and Social Choice—Normative principles of behavior, especially in single-person decision trees. Objective and subjective expected utility. Savage, Anscombe-Aumann, and consequentialist axioms. State dependence. Multi-person extensions: social choice, ethics, opinion pooling, and rationalizability in non-cooperative games. Prerequisite: 202 or equivalent.

2-5 units (Hammond) not given 2005-06

ECON 282. Contracts, Information, and Incentives—General issues and recent developments in mechanism design and the theory of contracts. Topics include: hidden characteristics and hidden action models with one and many agents, role of commitment and renegotiation in long-term relationships, incomplete contracts and applications to the theory of the firm.

2-5 units, Win (Segal)

ECON 283. Advanced Topics in Contracts and Organization—Recent developments and promising research. Topics may change from year to year, but may include: reputational concerns and implicit contracts in long-term relationships, property rights and the hold-up problem, multi-lateral contracting, communication requirements of allocation problems, communication without full commitment (cheap talk). Prerequisite: 282 or consent of instructors.

2-5 units (Tadelis) not given 2005-06

ECON 284. Topics in Dynamic Financial Economics—Dynamic general equilibrium asset pricing and economic volatility. Characteristics of real and financial volatility, the equity risk premium, the term structure of interest rates, and the forward premium. The role of dynamic learning and diversity of beliefs in the propagation of economic volatility, and the relationship of such diversity to money non-neutrality, the real effect of monetary shocks, and real business cycles theories; implications for problems of time consistency in monetary policy, rules versus discretion and alternative monetary rules. Recent papers presented by students. Prerequisites: 204 or equivalent, basic probability theory, or consent of instructor.

2-5 units (Staff) not given 2005-06

ECON 285. Market Design—Analysis of rules that govern the operation of markets with and without the assistance of prices. Emphasis is on markets in which complicated preferences and constraints, limitations on the use of cash, or variations in contract details among bidders decisively impair the performance of simple market rules. Matching markets such as the National Resident Matching Program and airline slot exchanges, asset auctions such as the spectrum auctions, electricity markets, and Internet procurement services.

2-5 units, Spr (Milgrom)

ECON 286. Game Theory and Economic Application—Solution concepts for non-cooperative games, repeated games, games of incomplete information, reputation, and experiments. Standard results and current research topics. Prerequisite: 203 or consent of instructor.

2-5 units, Spr (Levin)

ECON 287. General Equilibrium Theory—Existence, efficiency, and Walrasian equilibrium in exchange economies. Production, financial markets, incomplete markets, sequence economies with infinitely-lived agents. Prerequisites: 204 or consent of instructor.

2-5 units, Aut (Hammond)

ECON 288. Computational Economics—Computational approaches to solving economic problems. Overview of numerical analysis. Economic problems in computationally tractable forms, and the use of numerical analysis techniques to solve them. Examples of problems solved numerically (general equilibrium models, optimal taxation, dy-

dynamic programming, economic growth, life-cycle models, intervention in commodity markets, Bayesian econometrics, equilibria of dynamic and repeated games, and nonlinear rational expectations equilibria with asymmetric information). Prerequisite: equivalent of first-year graduate core economics sequence.

2-5 units (Judd) not given 2005-06

ECON 289. Advanced Topics in Game Theory and Information Economics—Topics include repeated games with informational asymmetries, including applications to collusion as well as government policy games and dynamic insurance problems; advanced topics in auction theory and mechanism design; intrapersonal games, such as self-control problems and dynamic inconsistency; information acquisition in decision problems, games, and mechanisms.

2-5 units (Staff) not given 2005-06

ECON 290. Multiperson Decision Theory—(Same as MGTECON 608.) Students and faculty review and present recent research papers on theories and economic applications of decision theory, game theory, and mechanism design. Applications include market design and analyses of incentives and strategic behavior in markets, and topics such as auctions, bargaining, contracting, and computation.

4 units, Spr (Wilson)

ECON 292. Comparative Analysis of Organizations and Institutions—Game theoretic; classic and evolutionary analysis of institutions as multiple equilibria. Norms, social embeddedness, organizations as conventions, contract enforcement and corporate governance mechanisms, and states. Institutional complementarities and diachronic institutional linkage.

5 units (Staff) not given 2005-06

ECON 385. Mathematical Economics Workshop

1-10 units, Aut, Win, Spr (Staff)

ECON 387. Microeconomics Workshop—(Same as MGTECON 629A.) Focus is on game-theoretic analyses. Topics from related fields such as macroeconomics, experimental and behavioral economics, electronic commerce, computer science, law, political science, and psychology.

2 units, Aut, Win, Spr (Staff)

ECON 391. Microeconomic Theory Seminar—Game theoretic (classic and evolutionary analysis of institutions as multiple equilibria). Norms, social embeddedness, organizations as conventions, contract enforcement and corporate governance mechanisms, and states. Institutional complementarities and diachronic institutional linkage. May be repeated for credit.

1-10 units, Aut, Win, Spr (Staff)

OVERSEAS STUDIES

Courses approved for the Economics major and taught overseas can be found in the "Overseas Studies" section of this bulletin, or in the Overseas Studies office, 126 Sweet Hall.

BERLIN

ECON 161X. The German Economy in the Age of Globalization

4-5 units, Win (Klein)

FLORENCE

ECON 126X. The Euro, the Dollar, and the Developing Countries in a World of Globalization

4 units, Spr (Yotopoulos)

MOSCOW

ECON 120X. Economic Reform and Economic Policy in Modern Russia

5 units, Aut (Mau)

PARIS

ECON 124X. Building the European Economy: Economic Policies and Challenges Ahead

5 units, Aut (Le Cacheux)

ECON 125X. Globalization and Its Effect on France and the European Union

5 units, Spr (Germanangue)

SANTIAGO

ECON 119X. The Chilean Economy: History, International Relations, and Development Strategies

5 units, Spr (Muñoz)

ECON 160X. Latin America in the International Economy

5 units, Win (Di Filippo)

ECON 165X. Latin American Economies in Transition

5 units, Aut (Di Filippo)