

# ECONOMICS

Courses offered by the Department of Economics (<http://economics.stanford.edu>) are listed under the subject code ECON on the Stanford Bulletin's ExploreCourses web site.

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 department's curriculum is an integral part of Stanford's programs in International Relations, Public Policy, and Urban Studies.

The faculty interests and research cover a wide spectrum of topics in most fields of economics, including behavioral economics, comparative institutional analysis, econometrics, economic development, economic history, experimental economics, industrial organization, international trade, labor, macro- and microeconomic theory, mathematical economics, environmental economics, and public finance.

## Mission of the Undergraduate Program in Economics

The mission of the undergraduate program in Economics 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. The program introduces students to macro- and microeconomic theory, teaches them to think and write clearly about economic problems and policy issues and to apply the basic tools of economic analysis. The undergraduate major provides an excellent background for those who plan careers in government and private enterprise as well as those pursuing graduate degrees in professional schools or in the field of economics.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. understanding of core knowledge within Economics.
2. ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
3. ability to write clearly and persuasively and communicate ideas clearly.
4. ability to evaluate theory and critique research within the discipline.

## Graduate Programs in Economics

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.

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.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Economics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Economics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Economics and to interpret and present the results of such research.

## Fellowships and Assistantships

The department awards a number of fellowships for graduate study. Many first-year and a few second- or third-year students are typically awarded full fellowships, including a stipend and tuition. Students in their final job market year are encouraged to apply for SIEPR dissertation research fellowships. All students whose records justify continuation in the program may be assured support for the second through fifth 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.

## Bachelor of Arts in Economics

The total number of units required for the major is 80. Students are encouraged to complete the core courses 1-6 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 five. There is great flexibility in the choice of electives, including some upper-division math, statistics, and computer science.

Of the 80 units required for the major, at least 55 must be taken at Stanford in California.

All courses counting toward the economics major must be taken for a letter grade and a GPA in the major of 2.0 (C) or better must be achieved.

## Requirements for the Economics Major (80 Units)

### Core Courses; 30 units

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I (Prerequisites: ECON 1 and MATH 51 (or CME 100 or CME 100A))	5
ECON 51	Economic Analysis II (Prerequisite: ECON 50)	5
ECON 52	Economic Analysis III (Prerequisite: ECON 50)	5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists (Prerequisite: MATH 20 or equivalent) <sup>1</sup>	5

ECON 102B	Applied Econometrics (Prerequisite: ECON 102A) <sup>2</sup>	5
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<sup>1</sup> It is recommended that students satisfy this basic statistics requirement early in their program.

<sup>2</sup> Material in ECON 102B Applied Econometrics is used in a number of field courses. Students are advised to take ECON 102B Applied Econometrics early in their program.

### Field Courses; 25 units

Must be taken at Stanford in California.

Select five of the following: 25

ECON 102C	Advanced Topics in Econometrics
ECON 111	Money and Banking (not offered this year)
ECON 112	Financial Markets and Institutions: Recent Developments
ECON 118	Development Economics
ECON 125	Economic Development, Microfinance, and Social Networks
ECON 126	Economics of Health and Medical Care
ECON 136	Market Design <sup>2</sup>
ECON 137	Decision Modeling and Information <sup>4</sup>
ECON 140	Introduction to Financial Economics <sup>1</sup>
ECON 141	Public Finance and Fiscal Policy
ECON 145	Labor Economics
ECON 146	Economics of Education
ECON 147	The Economics of Labor Markets
ECON 149	The Modern Firm in Theory and Practice
ECON 155	Environmental Economics and Policy
ECON 157	Imperfect Competition
ECON 160	Game Theory and Economic Applications <sup>3</sup>
ECON 164	The Law and Economics of the World Trading System (not offered this year)
ECON 165	International Finance
ECON 166	International Trade
ECON 178	Behavioral Economics
ECON 179	Experimental Economics (not offered this year)
ECON 180	Honors Game Theory <sup>3</sup>
ECON 181	Honors Information and Incentives (not offered this year) <sup>4</sup>
ECON 182	Honors Market Design <sup>2</sup>
ECON 198	Junior Honors Seminar
ECON 199D	Honors Thesis Research

<sup>1</sup> Students may not count units from both ECON 135 and ECON 140 Introduction to Financial Economics towards their major as the courses are too similar in content.

<sup>2</sup> Students may not count units from both ECON 136 Market Design and ECON 182 Honors Market Design towards their field course requirements as the courses cover similar subject matter.

<sup>3</sup> Students may not count units from both ECON 160 Game Theory and Economic Applications and ECON 180 Honors Game Theory towards their field course requirements as the courses cover similar subject matter.

<sup>4</sup> Students may not count units from both ECON 137 and ECON 181 towards their field course requirements as the courses cover similar subject matter.

### Writing in the Major Course; 5 units

Must be taken at Stanford in California. This course should be taken only after completing ECON 51 Economic Analysis II and ECON 52 Economic Analysis III, ECON 102B Applied Econometrics, and at least two field courses.

ECON 101	Economic Policy Seminar	Units 5
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### Electives: 20 units

20 units in addition to the field courses taken; choose from any ECON courses offered for a letter grade.

Up to 10 units of this requirement may be fulfilled by upper-division math, statistics, or computer science with the approval of the Director of Undergraduate Studies.

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 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.

### Other Requirements

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit, and 55 of the 80 units required for the major must be taken at Stanford in California.

Students scoring a 5 on both the advanced placement microeconomics and advanced placement macroeconomics exam may petition the Director of Undergraduate Studies to have the ECON 1 Principles of Economics course requirement waived. Students do not receive units credit for placing out of ECON 1 Principles of Economics.

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

Course prerequisites are enforced. Students taking courses to satisfy prerequisites in another department or institution must petition for Stanford course substitution or transfer credit approval in order to satisfy course prerequisites.

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.

### Flexible Tracks

Flexible Tracks listings of upper-division economics courses are provided to emphasize the diverse interests of Economics majors. Flexible Tracks do not add major requirements. Flexible Tracks may be examined in the department's Information Book for Economics Majors (<http://economics.stanford.edu/undergraduate>). Flexible Tracks are provided for the following areas of emphasis (field courses are in bold):

- Behavioral & Experimental (Econ 13N, **136 (or 182), 137 (or 181), 160 (or 180), 178, 179**)
- Finance (Econ 110, **111, 112, 129, 140, 141, 143, 152, 165, 184**)
- International & Development (Econ 15N, 106, **118, 120, 121, 124, 125, 127, 128, 162, 164, 165, 166**)

- Policy (ESF 1, Econ 11N, 15Q, 17N, 19Q, 22N, 23N, 27N, 47, **111, 118, 126, 141, 145, 146, 147**, 150, 152, 154, **155**, 159)
- Research (Econ **102C, 136 (or 182), 137 (or 181), 160 (or 180), 198, 199D, 202, 210**)
- Strategy (Econ 19Q, **136 (or 182), 137 (or 181), 149, 157, 160 (or 180)**)

### 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 submit their theses in writing and present them during the Honors Research Symposium during Spring Quarter. The honors program requires:

1. Completing all requirements for the major; plus five additional units, bringing the total to 85 units.
2. Achieving a grade point average (GPA) of at least 3.5 for the required courses of the Economics major (excluding ECON 139D Directed Reading and ECON 199D Honors Thesis Research). See details in the Information Book for Economics Majors.
3. Complete ECON 102B Applied Econometrics and at least two Econ upper division 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 80 units.)
4. Candidates must write an honors thesis in their senior year for at least one unit and up to nine units of credit in their thesis adviser's section of ECON 199D Honors Thesis Research. Additionally, winter registration for one unit of Honors Thesis Research, under the Director of the Honors Program section number is mandatory for all honors students. 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 ECON 199D Honors Thesis Research do not count toward the course work requirements for the basic economics major, or in the computation of the GPA requirement for honors.

Juniors interested in the honors program should contact the honors program director for more information. Prospective candidates for the honors program should submit an application to the director no later than October 20 for Spring Quarter degree conferral. Also required, in the same quarter, is a three-page thesis proposal that must be approved by the thesis adviser.

## Minor in Economics (35 Units)

The minor in Economics has two main goals: to acquaint students with the rudiments of micro- and macroeconomic theory that are required of all majors; and to allow students to build 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.

### Core Courses: 20 units

ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I (Prerequisites: ECON 1 and MATH 51 or CME 100 or CME 100A)	5
ECON 51	Economic Analysis II (Prerequisite: ECON 50)	5
ECON 52	Economic Analysis III (Prerequisite: ECON 50)	5

### Minor Field Courses: 10 units

Must be taken at Stanford in California

ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5

ECON 102C	Advanced Topics in Econometrics	5
ECON 111	Money and Banking (not offered this year)	5
ECON 112	Financial Markets and Institutions: Recent Developments	5
ECON 118	Development Economics	5
ECON 125	Economic Development, Microfinance, and Social Networks	5
ECON 126	Economics of Health and Medical Care	5
ECON 136	Market Design <sup>2</sup>	5
ECON 137	Decision Modeling and Information <sup>4</sup>	5
ECON 140	Introduction to Financial Economics <sup>1</sup>	5
ECON 141	Public Finance and Fiscal Policy	5
ECON 145	Labor Economics	5
ECON 146	Economics of Education	5
ECON 147	The Economics of Labor Markets	5
ECON 149	The Modern Firm in Theory and Practice	5
ECON 155	Environmental Economics and Policy	5
ECON 157	Imperfect Competition	5
ECON 160	Game Theory and Economic Applications <sup>3</sup>	5
ECON 164	The Law and Economics of the World Trading System (not offered this year)	5
ECON 165	International Finance	5
ECON 166	International Trade	5
ECON 178	Behavioral Economics	5
ECON 179	Experimental Economics ((not offered this year))	5
ECON 180	Honors Game Theory <sup>3</sup>	5
ECON 181	Honors Information and Incentives (not offered this year) <sup>4</sup>	5
ECON 182	Honors Market Design <sup>2</sup>	5
ECON 198	Junior Honors Seminar	5
ECON 202	Microeconomics I <sup>5</sup>	2-5
ECON 210	Macroeconomics I <sup>5</sup>	2-5

<sup>1</sup> Students may not count units from both ECON 135 and ECON 140 Introduction to Financial Economics towards their minor as the courses are too similar in content.

<sup>2</sup> Students may not count units from both ECON 136 Market Design and ECON 182 Honors Market Design towards their minor as the courses cover similar subject matter.

<sup>3</sup> Students may not count units from both ECON 160 Game Theory and Economic Applications and ECON 180 Honors Game Theory towards their minor as the courses cover similar subject matter.

<sup>4</sup> Students may not count units from both ECON 137 Decision Modeling and Information and ECON 181 Honors Information and Incentives towards their minor as the courses cover similar subject matter.

<sup>5</sup> Students may enroll with permission of the Director of Undergraduate Studies and the course instructor.

### Electives: 5 units

Select from: Any ECON courses offered for letter grades

### Other Requirements

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. The combined

total of all units for the minor must equate to the grade point average (GPA) of 2.0 (C) or better.

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

## Master of Arts in Economics

University requirements for the master's degree are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin.

The department does not admit students who plan to terminate their graduate study with the M.A. degree. Students must be currently enrolled in a Ph.D. program at Stanford before adding the Economics M.A. degree. Economics students may, but need not, elect to add this degree in addition to their current Ph.D. degree after they have been enrolled at Stanford for at least one quarter. A master's option is also available to currently enrolled Ph.D. candidates from other departments.

### Adding the M.A. Degree

In order to add this degree to their program plan, current Ph.D. students should submit a Graduate Authorization Petition via Axess and submit an M.A. program proposal form to the student services manager for approval. 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 before the petition to add the M.A. will be approved.

### Degree 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 Microeconomics I or ECON 202N Microeconomics I For Non-Economics PhDs and at least three other 200-level lecture courses. They must receive a grade of 'B-' or better in ECON 202 Microeconomics I or ECON 202N Microeconomics I For Non-Economics PhDs. Undergraduate courses must be numbered 105 or higher (with the exception of the ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, ECON 102C Advanced Topics in Econometrics sequence listed below). 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 Intermediate Econometrics I and ECON 271 Intermediate Econometrics II, or by receiving a grade of 'B-' or above in each of ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, and ECON 102C Advanced Topics in Econometrics.
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 5 units of credit can be earned for a directed reading/thesis (ECON 239D, ECON 400, or comparable thesis course in home department) toward the 45-unit degree requirement. In lieu of this paper requirement, students may elect to take two additional 200+ level Economics courses.
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 in Economics

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin.

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. 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. A minimum of 135 completed units is required for the degree. 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.

### Requirements for the Ph.D.

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:

### Graduate Core

1. Successful completion of core sequences in microeconomics, macroeconomics, and econometrics:

		Units
<b>A. Microeconomics</b>		
ECON 202	Microeconomics I	2-5
ECON 203	Microeconomics II	2-5
ECON 204	Microeconomics III	2-5
<b>B. Macroeconomics</b>		
ECON 210	Macroeconomics I	2-5
ECON 211	Macroeconomics II	2-5
ECON 212	Macroeconomics III	2-5
<b>C. Econometrics</b>		
ECON 270	Intermediate Econometrics I	2-5
ECON 271	Intermediate Econometrics II	2-5
ECON 272	Intermediate Econometrics III	2-5

To pass a sequence, an overall grade of 'B' is required for the sequence, and individual course grades must be 'B-' or better. Petitions to substitute courses or waive out of any core course must be submitted to the Director of Graduate Study at least two weeks before the start of the term.

2. Completing the requirements in two additional advanced 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 (e.g. GSB Finance). Students may request permission from the Director of Graduate Study to create a field not listed as

an advanced field below, such as International Finance or Law & Economics. Requirements for completing a field can usually be satisfied by completing two courses and a paper, although students in some fields may be advised to add a third course, which can then be counted toward the distribution requirement discussed later. A minimum grade average of B is required to pass a field sequence. Individual course grades cannot be less than a B- in order to count for field course credit. Specific requirements for completing each field can be found on the Economics department website (<http://economics.stanford.edu>).

3. Completing a candidacy paper, normally written in conjunction with one of the advanced specialty fields selected above. Submission of this paper or another research paper is required by the first day of Autumn Quarter of the third year. Satisfactory presentation of this paper is required in the Autumn quarter third year seminar. It is expected that the student meet, and indeed exceed, the above standards by the end of the first quarter in 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 third 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 a student fulfills the department prerequisites for applying for candidacy and submits their candidacy application form, the faculty votes to determine whether the student has the potential to successfully complete the requirements of the degree program. If approved, 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. Failure to advance to candidacy results in dismissal from the program.

## Further Requirements for the Ph.D. Degree

1. *Third Year Seminar*: presentation of an expanded research paper in Spring Quarter of the third year.
2. *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.
  - d. all courses used to fulfill distribution requirements must be passed with a grade of B or better.
3. *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 fourth year of residence.
4. *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). Detailed information on fulfilling the seminar requirements can be found on the Economics department website (<http://economics.stanford.edu>).
5. *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.

## Graduate Fields

### A. Behavioral and Experimental Economics

To receive credit for this field, students must take the following three courses. Research papers and presentations are requirements of these courses.

		Units
ECON 278	Behavioral and Experimental Economics I	2-5
ECON 279	Behavioral and Experimental Economics II	2-5
ECON 277	Behavioral and Experimental Economics III	2-5

### B. Econometric Methods For Causal Inference

To receive credit for the Econometric Methods field, students must complete the two courses listed below.

		Units
ECON 292	Quantitative Methods for Empirical Research	2-5
ECON 293	Machine Learning and Causal Inference	3

### C. Econometrics

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

#### • C-A: Theoretical Econometrics:

To receive credit in the theoretical econometrics subfield, students must complete two courses from:

		Units
ECON 273	Advanced Econometrics I	2-5
ECON 274	Advanced Econometrics II	2-5
ECON 292	Quantitative Methods for Empirical Research <small>Econ 292 is also known as GSB MGTECON 640</small>	2-5

#### • C-B: Applied Econometrics:

To receive credit in the applied econometrics subfield, students must complete ECON 273 and either ECON 275 or ECON 276. 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 275 or 276.

		Units
ECON 273	Advanced Econometrics I	2-5
ECON 275	Economics-Based Econometrics	3-5
ECON 276	Computational Econometrics (not offered this year)	2-5

### D. Economic Development

To receive credit for this field, students must complete two courses from the following list. Students are required to develop and present a series of research ideas throughout each course. Regular attendance at the Development Economics workshop and the Development student workshop is required.

		Units		Units	
ECON 214	Development Economics I	2-5	ECON 246	Labor Economics I	2-5
ECON 215	Development Economics II	2-5	ECON 247	Labor Economics II	2-5
ECON 216	Development Economics III (offered next year)	2-5	ECON 248	Labor Economics III	2-5

Each course requires completion of a term paper. Each course must be passed with a grade of B or better.

### E. Economic History/Institutions

Students must complete two courses from the following list and develop a research proposal in each course. Presentation of a research proposal is required at the end of the second year. Regular attendance (at least four quarters) at the economic history workshop is required.

		Units		Units	
ECON 225	Economics of Technology and Innovation (not offered this year)	2-5	ECON 233	Advanced Macroeconomics I	2-5
ECON 226		2-5	ECON 234	Advanced Macroeconomics II	2-5
ECON 227	European Economic History	2-5	ECON 235	Advanced Macroeconomics III (not offered this year)	2-5
ECON 228	Institutions and Organizations in Historical Perspective	2-5	ECON 236	Financial Economics I	2-5
			ECON 237	Financial Economics II	2-5

### F. Environmental, Resource and Energy Economics

To receive credit for this field, students must complete:

		Units
ECON 250	Environmental Economics	2-5
ECON 251	Natural Resource and Energy Economics	2-5

### G. Finance

To receive credit for the field, students must complete two courses from list below. A 20-minute research project proposal is required.

		Units
ECON 236	Financial Economics I	2-5
ECON 237	Financial Economics II	2-5
FINANCE 622	Dynamic Asset Pricing Theory	4
FINANCE 624	Corporate Finance Theory	4
FINANCE 625	Empirical Asset Pricing	3

### H. Industrial Organization

To receive credit for the field, students must complete:

		Units
ECON 257	Industrial Organization I	2-5
ECON 258	Industrial Organization IIA <sup>1</sup>	2-5

<sup>1</sup> ECON 251 can substitute for ECON 258 only, as long as the student is not also using ECON 251 to fulfill requirements for the Environmental field.

<sup>2</sup> Students who select Industrial Organization as a primary focus are expected to also take ECON 260.

### I. International Trade

To receive credit for this field, students must complete two courses and research papers from:

		Units
ECON 266	International Trade I	2-5
ECON 267	International Trade II (recommended)	2-5

Students must pass both courses with a grade of B or better.

### J. Labor Economics

To receive credit for this field, students must complete two courses from:

### K. Macroeconomics

Requirements for this field are completion of two courses from the list below. Presentation of a research proposal in each course is required. ECON 236 and 237 may not be double-counted towards both the macroeconomics and the finance field.

		Units
ECON 233	Advanced Macroeconomics I	2-5
ECON 234	Advanced Macroeconomics II	2-5
ECON 235	Advanced Macroeconomics III (not offered this year)	2-5
ECON 236	Financial Economics I	2-5
ECON 237	Financial Economics II	2-5

### L. Market Design

To receive credit for this field, students must take two from the following and give a research presentation:

		Units
ECON 283	Theory and Practice of Auction Market Design	2-5
ECON 285	Matching and Market Design	2-5
ECON 289	Advanced Topics in Game Theory and Information Economics	2-5

### M. Microeconomic Theory

To receive credit for this field, students must complete two courses from the following and give a research presentation:

		Units
ECON 282	Contracts, Information, and Incentives	2-5
ECON 286	Game Theory and Economic Applications	2-5
ECON 291	Social and Economic Networks	2-5

### N. Political Economy

To receive credit for this field, students must complete the two courses below and develop and present a research proposal in each course. The two proposals may be based on a single project, provided there is significant progress between quarters.

		Units
ECON 220	Political Economy I	2-5
ECON 221	Political Economy II	2-5

### O. Public Economics

To receive credit for the field, students must complete the two courses below unless they have received approval for a substitute course. At the discretion of the instructors of 241 and 242, students may be able to substitute a graduate level course on social insurance, health economics, environmental economics or another closely related topic. Substitute courses must be approved in advance. Regular attendance at the Public Economics workshop is required to receive credit for the field.

		Units
ECON 241	Public Economics I	2-5
ECON 242	Public Economics II	2-5

## Ph.D. Minor in Economics

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 (Microeconomics, Macroeconomics, Econometrics). The standard of achievement in these fields is the same for minor as for major candidates, including minimum grade requirements, paper submissions and research presentations where appropriate. All courses used for the Ph.D. minor must be taken for a letter grade.

## Joint Degree Programs in Economics with the School of Law

### J.D./M.A. and J.D./PH.D.

The Department of Economics and the School of Law offer a joint program leading to either a J.D. degree combined with an M.A. degree in Economics, or to a J.D. degree combined with a Ph.D. in Economics.

The J.D./M.A. and J.D./Ph.D. degree programs are designed for students who wish to prepare themselves for careers in areas relating to both law and economics. Students interested in either joint degree program must apply and gain entrance separately to the School of Law and the Department of Economics and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Economics department may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Department of Economics. Faculty advisers from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school, and, at some point during the joint program, may be required to devote one or more quarters largely or exclusively to studies in the Economics program regardless of whether enrollment at that time is in the Law School or in the Department of Economics. At all other times, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the M.A. or Ph.D. degrees as specified in this bulletin or by the School of Law.

The Law School approves courses from the Economics Department that may count toward the J.D. degree, and the Economics department approves courses from the Law School that may count toward the M.A. or Ph.D. degree in Economics. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The list may differ depending on whether the student is pursuing an M.A. or a Ph.D. in Economics.

In the case of a J.D./M.A. program, no more than 45 quarter hours of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 quarter hours of approved courses may be counted toward both degrees. In either case, no more than 36 quarter hours of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of Law School credits that may be counted toward the M.A. or the Ph.D. in Economics is the greater of: (a) 5 quarter hours in the case of the M.A. and 10 quarter hours in the case of the Ph.D.; or (b) the maximum number of hours from courses outside of

the department that M.A. or Ph.D. candidates in Economics are permitted to count toward the applicable degree under general departmental guidelines or in the case of a particular student's individual program.

Tuition and financial aid arrangements are normally made through the school in which the student is then enrolled.

For more information, see the Law School's Degrees and Joint Degrees (<http://www.law.stanford.edu/program/degrees>) web site.

## Joint Degree Program in Ph.D. in Economics and Master of Public Policy

The Ph.D./M.P.P. joint degree is designed for students who wish to prepare themselves for careers in areas relating to both policy and economics. Students interested in this degree first apply to the Economics Department, indicating an interest in the joint program. There is one admissions application and one fee. If the decision is made by the department to admit the applicant, the file is then forwarded to the M.P.P. program. An admission decision, based on the information in the Ph.D. application, is made promptly, and the department informs the student of the decision.

Students may also apply to the M.P.P. after having commenced study in the Economics Department at Stanford, by first receiving the consent of the Director of Graduate Studies in Economics and then applying to the Public Policy program.

Students must have a faculty adviser from the Economics Department to assist with the planning and supervising of the joint program. The adviser is usually chosen from among the department's Public Policy-affiliated faculty.

Tuition and financial aid arrangements are made through the Economics Department.

## Requirements for the M.P.P./Ph.D. in Economics

### Core M.P.P. curriculum of 45 units

		Units
PUBLPOL 301B	Economic Policy Analysis for Policymakers	4-5
PUBLPOL 302A	Introduction to American Law	3-5
PUBLPOL 302B	Economic Analysis of Law	3
PUBLPOL 304A	The Ethics and Politics of Collective Action	3-4
PUBLPOL 305B	Public Policy and Social Psychology: Implications and Applications	4
PUBLPOL 306	Writing and Rhetoric for Policy Audiences	4
PUBLPOL 307	Justice	4-5
PUBLPOL 309	Practicum	1-10
PUBLPOL 311	Public Policy Colloquium	1
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change	4
Total Units		31-45

## Other Programs

Other programs leading to dual degrees may be arranged. For example, the Ph.D. in Economics combines with one or two years of study in the School of Law, leading to the nonprofessional Master of Legal Studies (M.L.S.) degree. A dual degree program does not permit counting any courses toward both the Economics and the Law degrees. For more information, see the Law School's Degrees and Joint Degrees (<http://www.law.stanford.edu/program/degrees>) web site.

## Graduate Advising Expectations

For a statement of University policy on graduate advising, see the "Graduate Advising (<http://exploreddegrees.stanford.edu/graduatedegrees/#advisingandcredentialstext>)" section of this bulletin.

The Department of Economics is committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the adviser and the advisee. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the adviser and the advisee are expected to maintain professionalism and integrity.

Faculty advisers guide students in key areas such as selecting courses, designing and conducting research, developing of teaching pedagogy, navigating policies and degree requirements, and exploring academic opportunities and professional pathways.

Graduate students are active contributors to the advising relationship, proactively seeking academic and professional guidance and taking responsibility for informing themselves of policies and degree requirements for their graduate program. Outlined below are a list of specific responsibilities of the various advising relationships, year by year:

### First Year

First-year students are assigned to an adviser in groups of four or five students, so that there are only a handful of first-year advisers. First-year advisers should meet with students early in Autumn Quarter and offer to help with any questions as the year progresses. Including the DGS, Ph.D. administrator, student mentors, study groups, core course instructors, and the first-year seminar series, students have a variety of information sources. The adviser is simply another person to whom the students can turn to for basic and broad advice about the program.

If a first year adviser sees a student struggling academically or personally, please ensure that they are connected to the help that they need, and if unsure of how to help please consult with the DGS.

### Second-Year RAship

The second-year RA-ship is an opportunity for students to gain experience with research. The RA-ship is subsidized by the department and is 15 hours/week (rather than the 20 for standard RAships in later years). Students are advised to ensure that it is as educational as possible. Some students have fellowships and thus do not need RA support, but should still seek advisers and should be given the same attention to ensure that their research is progressing.

### Second-Year Paper

The second-year paper is due at the beginning of Autumn Quarter of the third year, and students have to agree with a faculty member to oversee that paper by the end of the Spring Quarter of the second year.

An adviser on a second-year paper should make sure that the student is progressing on the paper during the Summer by setting a timeline and meeting with them at key points. It is essential that this be finished on time so that students can move on to new projects or to further develop it during the third year. Students are encouraged to talk to multiple faculty, but the person who signs their paper should take responsibility. The student also has a responsibility to be seeking advice and communicating regularly with their adviser, both about progress and unexpected setbacks, both of which are inevitable in research. Note that second-year papers can be co-authored with other students and/or faculty.

### Third-Year Advising

The third-year seminar helps shepherd students through the transition to dissertation research; however, it is not a substitute for an adviser but

rather a complement. Students should clear their slides for their third-year presentations with their advisers before the presentations.

The adviser and student are both responsible for ensuring that they meet regularly and have set a clear a timeline and goals for their research.

At the end of the third year, students meet with the DGS and present a form signed by someone agreeing to advise their dissertation research, and they should have plans for a dissertation and a committee. If a faculty member is advising a student during the third year and does not plan to continue that relationship, the faculty member is responsible for letting the student know early enough so that s/he can find a new adviser going forward. Occasionally, students who are getting substantial advice from more than one person may wish to designate co-primary advisers. This involves a serious commitment in terms of time and attention from all of the primary advisers, and should involve more than window-dressing.

### Fourth Year and Beyond

Advisers and students should be meeting regularly and have a clear plan and timeline for completion of a dissertation research and going on the market. The adviser's role includes providing guidance concerning designing, implementing, conducting, writing, presenting, submitting (where, how, etc.), and revising their research. The adviser should meet regularly with the student and inform the DGS if a student is languishing or falling behind in their research.

Advisers should be very clear with students about how their research is progressing and what they need to do to improve. Students are responsible for being broadly engaged, keeping their adviser regularly informed of their progress, and seeking advice from several faculty, attending and participating in conferences, regularly attending seminars, talking with other students, and more generally being regularly involved in research-related activities.

Faculty who are on a student's dissertation committee must discuss the student's job market prospects with him or her well in advance of the job market. It is essential to calibrate students' expectations appropriately. If the student aspires to jobs for which a committee member feels s/he cannot write supportive letters, that faculty must make that fact absolutely clear to the student well in advance. The faculty member must also confer with other committee members to determine whether they are in agreement concerning the student's progress, job market plans, and likely prospects. A dissertation committee member whose assessment of a student is out of line with the rest of the committee has an obligation to make their views known to the committee well before the student enters to job market, and should be willing to withdraw from the committee if it is in the student's best interest. Committee members should therefore compare their assessments, at the latest, by the start of the Autumn Quarter during which the student enters the job market.

Students need to become self-sufficient; most of these aspects of conducting and disseminating research are not learned via courses or readings, but by doing coupled with timely advice. It is the most important, and rewarding, part of the Ph.D. program.

An extensive and detailed guide to the adviser/advisee relationship and responsibilities appears in the department's Graduate Student Handbook ([http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/economics/Grad\\_Handbook\\_18-19.pdf](http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/economics/Grad_Handbook_18-19.pdf)).

*Emeriti:* (Professors) Takeshi Amemiya, Timothy F. Bresnahan, Paul A. David, Victor R. Fuchs, John G. Gurley, Peter J. Hammond, Donald Harris, Bert G. Hickman, Mordecai Kurz, Lawrence J. Lau, Roger G. Noll, John H. Pencavel, Thomas Sargent, David A. Starrett, Joseph E. Stiglitz, Gavin Wright

*Honorary Emerita:* (Professor) Anne O. Krueger



*Chair:* B. Douglas Bernheim

*Professors:* Kyle Bagwell, B. Douglas Bernheim, Nicholas Bloom, Michael Boskin, Mark Duggan, Liran Einav, Matthew Gentzkow, Lawrence Goulder, Avner Greif, Robert E. Hall, Han Hong, Caroline Hoxby, Guido Imbens, Matthew Jackson, Patrick Kehoe, Pete Klenow, Jonathan Levin, Thomas MaCurdy, Paul R. Milgrom, Muriel Niederle, Monika Piazzesi, Luigi Pistaferri, Joseph Romano, Alvin Roth, K. Martin Schneider, Ilya Segal, John B. Shoven, John B. Taylor, Frank Wolak

*Associate Professors:* Ran Abramitzky, Pascaline Dupas, Fuhito Kojima

*Assistant Professors:* Adrien Auclert, Luigi Bocola, Gabriel Carroll, Arun Chandrasekhar, Pablo Kurlat, Bradley Larsen, Melanie Morten, Petra Persson, Isaac Sorkin

*Lecturers:* Marcelo Clerici-Arias, Gopi Shah Goda, Alexander Gould, Ward Hanson, Chris Makler, Scott McKeon, Martin O'Connell, Cristian Santesteban, Brett Saraniti, Thomas Shanahan, Mark Tendall, Ramin Toloui, Rebecca Toseland

*Courtesy Professors:* Anat Admati, Susan Athey, Jay Bhattacharya, Jeremy Bulow, Steve Callander, Darrell Duffie, Marcel Fafchamps, James Fearon, Stephen Haber, David Kreps, Edward Lazear, Rosamond Naylor, Peter C. Reiss, Kenneth Singleton, Andrzej Skrzypacz

*Courtesy Associate Professor:* Saumitra Jha

*Courtesy Assistant Professor:* Rebecca Diamond, Jacob Goldin

*Visiting Professors:* Olivier Tercieux

*Visiting Associate Professor:* Sven Seuken

*Visiting Assistant Professor:* Frank Schilbach

*Visiting Scholars:* Alan Spearot, Kurt Mitman

*Visiting Postdoc:* Florian Brandl

OSPPARIS 91	The Future of Globalization: Economics, Politics and the Environment	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5

## Overseas Studies Courses in Economics

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 82	Globalization and Germany	4-5
OSPCPTWN 74	Development Economics: An Introduction from the Ground Up	5
OSPFLOR 26	The Politics of the European Crisis: from the Maastricht Treaty to the Greek Crunch	5
OSPMADRD 40	Pirates, Soccer, and Dons: A Sampler of Economics and Data Science in Spain	3
OSPMADRD 54	Contemporary Spanish Economy and the European Union	4
OSPOXFRD 45	British Economic Policy since World War II	4-5
OSPOXFRD 49	Environmental Economics and Policy	3-5
OSPPARIS 23	Economic Policy Challenges in France	5