

## Economics

### College of Arts and Sciences Bloomington

**Chairperson**

Professor Gerhard Glomm\*

**Departmental E-mail**[rcunning@indiana.edu](mailto:rcunning@indiana.edu)**Departmental URL**[www.indiana.edu/~econweb](http://www.indiana.edu/~econweb)

### Graduate Faculty

(An asterisk [\*] denotes membership in the University Graduate School faculty with the endorsement to direct doctoral dissertations.)

**Distinguished Professors**

Robert Campbell\* (Emeritus), H. Scott Gordon\* (Emeritus, History and Philosophy of Science)

**Chancellor's Professor**

Roy Gardner\*

**Rudy Professor**

Pravin Trivedi\*

**Wisniewsky Professor of Human Studies**

Joon Park\*

**Professors**

Michael Alexeev\*, Robert Becker\*, William Becker\*, Edward Buffie\*, Fwu-Ranq Chang\*, Yoosoon Chang\*, Gerhard Glomm\*, Michael Kaganovich\*, Paul Kuznets\* (Emeritus), Eric Leeper\*, Lloyd Orr\* (Emeritus), Frank Page Jr.\*, Phillip Saunders\* (Emeritus), George von Furstenberg\* (Emeritus), James Walker\*, Elmus Wicker\* (Emeritus), Arlington Williams\*

**Associate Professors**

Elyce Rotella\*, Willard Witte\* (Emeritus)

**Assistant Professors**

Rubiana Chamarbagwala, Juan Carlos Escanciano\*, Kim Huynh, David Jacho-Chavez, Bulent Guler, Yoon-Jin Lee, Ricardo Lopez, Todd Walker\*

University Graduate School  
Kirkwood Hall 111  
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**Director of Graduate Studies**

Professor Eric Leeper\*, Wylie Hall 229, (812) 855-8453

### Degrees Offered

Master of Arts, Master of Arts for Teachers, Doctor of Philosophy in economics, and Doctor of Philosophy in economics and business (in cooperation with the Kelley School of Business)

### Special Departmental Requirements

(See also general University Graduate School requirements.)

**Admission Requirements**

Twenty-five (25) credit hours of social science and business, including intermediate economic analysis. First-year differential and integral calculus and one semester of linear algebra are required for the Ph.D. and the M.A. Deficiencies in economics must be removed without graduate credit. Graduate Record Examination General Test (verbal, quantitative, and analytical sections) required.

Grades At least a B (3.0) average in work taken for an advanced degree.

### Master of Arts Degree

**Course Requirements**

A minimum of 30 credit hours, 24 of which must be taken in the Department of Economics, including 9 credits of theory and 6 credits of statistics. A minimum of 18 credit hours of course work in economics must be numbered E500 or above. Consult the Director of Graduate Studies for specific courses. Up to 6 credit hours are allowable for a thesis. In lieu of writing a thesis, a student may complete 6 credit hours of course work (beyond the required 30 credit hours) in one of the following research skills: operations and decision technologies, computer science, mathematics, or econometrics beyond E572. Courses used to fulfill a research skill requirement do not carry graduate credit.

### Master of Arts for Teachers Degree

An individual study program of 36 credit hours will be developed for each student, normally including only courses that may be taken for graduate credit.

### Doctor of Philosophy Degree

**Fields of Study**

Choices of fields offered for qualifying examinations must be approved by the Graduate Studies Committee. Fields of study currently available within the department are advanced economic theory, development economics, development and transition economics, econometrics, economic history, games and experimental methods, growth theory, industrial organization, international trade, macroeconomics, monetary economics, and public economics. In addition, a field in finance is available in partnership with the Kelley School of Business. Fields of study in the Kelley School of Business that are available for the joint Ph.D. degree are accounting, finance, operations management, marketing, and operations and decision technologies. Information about other fields may be obtained from the Director of Graduate Studies.

### Course Requirements

A total of 90 credit hours, including the theory sequence E520, E521, E522, E621, E622, and the econometrics-statistics sequence E571, E572, E671. All Ph.D. students join a workshop after passing their core theory exams. In addition, starting in their third year, students have to formally enroll in a workshop course for three semesters. There is a minimum requirement of 60 credit hours of course work. A minimum of 57 credit hours must be taken in economics.

### Research-Skill Requirement

Proficiency in mathematics, operations and decision technologies, computer science, or econometrics/applied statistics. Courses used to fulfill a research skill requirement do not carry graduate credit.

### Core Theory Examination

Core theory examinations in macroeconomics and microeconomics are taken at the end of the first year in residence. A maximum of two attempts will be permitted on each section. The exams are given in May, and retakes are administered in August.

### Qualifying Field Examinations

The Ph.D. candidate must successfully complete at least three fields: one primary field and two supporting (secondary) fields. One of these fields may be taken outside the Department of Economics. A qualifying examination must be taken in the primary field; courses in supporting fields must be passed with grades of B or better. Consult the economics department's Graduate Study Guide for further information.

### Third-Year Paper Requirement

Ph.D. students are required to write a substantial research paper before the end of the spring semester of their third year. The paper will be presented at a departmental conference at the end of April or the beginning of May of the third year. The goal should be that this paper is of sufficient quality to be the first essay of the dissertation.

### Dissertation Proposal

The proposed research for the dissertation must be approved by the research committee and presented at a department workshop.

### Final Examination

Oral defense of the dissertation.

## Courses Offered

**E471 Econometric Theory and Practice I (3 cr.)** P: E370 or either MATH M119 or M211 or consent of instructor. Emphasis is on the probability and statistical theory underpinning the classical linear regression model. Special topics include finite and asymptotic properties of point and interval estimation, hypothesis testing and model building. Several software packages are used in computer lab applications.

**E472 Econometric Theory and Practice II (3 cr.)** P: E471. Emphasis is on the matrix formulation and computer estimation methods for single and multiple equation models using economic and business data. Attention is given to the assumptions required for testing sets of coefficients and model structures. Special topics include heteroscedasticity, multicollinearity, errors in variables, simultaneity, time-series analysis, limited dependent variables, sample selection, and alternatives to least-squares estimation.

**E501 Seminar in Economics (3 cr.)** P: Consent of instructor. Advanced topics in economics ranging across all fields.

**E502 Teaching Undergraduate Economics (3 cr.)** Planning, presenting, and evaluating undergraduate economics teaching. Content includes learning theory, instructional objectives, course planning, textbook selection, lecturing and discussion techniques, visual aids and simulation, constructing test and homework problems, grading, student evaluation of instruction, practical classroom teaching problems, and survey of evaluation literature.

### E520 Optimization Theory in Economic Analysis (3 cr.)

P: Calculus and linear algebra. Introduction to concepts and techniques of optimization theory applied in modern micro- and macroeconomics. Theory and application of Lagrange multipliers, comparative statics analysis, value functions and envelope theorems. Elements of dynamic programming and other methods of economic dynamics.

**E521 Theory of Prices and Markets I (3 cr.)** Develops the methodology of economic analysis and teaches the tools and language of price theory. Fundamental elements of consumer theory, producer theory, and economics of uncertainty. Emphasis on comparative statics and the duality theory. Topics include welfare analysis, the theory of price indices, quality of goods, revealed preferences, the theory of derived demand, expected utility theory, attitudes toward risk, and various measures of riskiness.

**E522 Macroeconomic Theory I (3 cr.)** Introductory course on macroeconomic dynamics; covers growth models and asset pricing theories, endogenous growth theories, optimal growth problems, and competitive dynamic equilibrium models. Dynamic programming tools introduced as needed. All models are cast in a discrete time setup; presents deterministic and

stochastic theories.

**E529 Economic History (3 cr.)** P: E521 or consent of instructor. Use of economic analysis and econometric techniques to examine topics in the development and institutions of the U.S. and European economies.

**E530 International Trade (3 cr.)** P: E521, E621, or consent of instructor. Introduction to theories of international trade (including such topics as pattern of trade, gains from trade, testing trade theories) and analysis of trade policies (including such topics as tariffs, quotas, and strategic trade policy).

**E541 Labor Market Analysis (3 cr.)** P: E520 or E521, or consent of instructor (Bloomington); P: Consent of instructor (Indianapolis). An analytical approach to the labor market. Theoretical underpinning and statistical testing of issues in demand and supply of labor, household decision making, human capital, contract theories, unionism, minimum wages, and discrimination.

**E550 Monetary Theory and Organization (3 cr.)** Theory and practice of monetary control; supply and demand functions for money; instruments of monetary control; channels through which money exerts an influence on the economy.

**E551 Monetary Economics II (3 cr.)** Introduces alternative models of monetary economies; covers topics in monetary economics such as money and growth and optimal money growth. The course takes a unified approach to macroeconomic policy, treating monetary and fiscal policy as jointly determining macroeconomic equilibria. May include discussion of empirical work on money.

**E571 Econometrics 1 - Statistical Foundations (3 cr.)** P: Undergraduate courses in statistics and calculus. The probability bases for statistical estimation and testing are introduced in the context of issues, theories, and data found in economics. The classical linear regression model is presented as the starting point for multivariate analyses in econometrics. Students work with various computer programs in and out of the scheduled class periods.

**E572 Econometrics 2 - Regression and Time Series (3 cr.)** P: E571 or equivalent. Regression and time series. Departures from classical regression. Generalized least squares; heteroskedastic models; dynamic regression. Basic asymptotics. Measurement errors and instrumental variables. Some standard nonlinear models. Course covers theory and data analysis.

**E585 Industrial Organization and Control (3 cr.)** P: Consent of instructor (Indianapolis only). Analysis of interrelated structure, behavior, and performance in industrial markets and multi-market corporations; multidimensional nature of competitive processes. Public controls. Topics include patterns of oligopoly, vertical integration, entry barriers; "cartelized" coalescence, limit pricing, price discrimination, long-term contracts; capacity expansion and utilization, resource reallocation, and innovation.

**E591 Macro Topics in Economic Development (3 cr.)** P: E521, E522, or consent of instructor. Analysis of new theories of economic growth and various issues related to macroeconomic policy in less-developed countries. Topics include fiscal reform, exchange rate policy, financial liberalization, and money vs. exchange rate-based stabilization programs.

**E592 Trade Policy and Economic Development (3 cr.)** Examines the major issues surrounding the conduct of trade policy in less-developed countries. Covers arguments for and against import-substituting vs. export-promoting policies, the nature of optimal commercial policy, alternative strategies for liberalization of the trade regime, and the pros and cons of direct foreign investment.

**E621 Theory of Prices and Markets II (3 cr.)** P: E521, calculus, and linear algebra. Analysis of equilibrium, first- and second-order conditions; statistical derivation of demand and cost curves; activity analysis; general equilibrium; welfare economics; microeconomics of capital theory; pure oligopoly and game theory.

**E622 Macroeconomic Theory II (3 cr.)** P: E522, calculus, and linear algebra. Extends general equilibrium models from E522 by introducing nominal variables, monetary and fiscal policies; some exposure to alternative dynamic models, nominal and real rigidities, market imperfections, dynamically consistent policies. Numerical methods introduced to simulate dynamic stochastic general equilibrium models. Time series methods presented to discuss empirical implications of aggregate models.

**E624 Mathematical Economics I (3 cr.)** P: One year of calculus, one semester of linear algebra, or consent of instructor. Introduction to stochastic control theory with applications to economics. Covers Wiener process, stochastic integration, Ito's lemma and the stochastic Bellman equation. Applications to economics include optimal growth theory, the inverse optimal problem, adjustment cost theory of supply, exhaustible resources, optimal consumption and portfolio rules, and transactions demand for money.

**E625 Mathematical Economics II (3 cr.)** P: One year of calculus, one semester of linear algebra, or consent of instructor. Mathematical analysis of problems of motion via Central Principle of Motion; dynamic efficiency of centralized and decentralized economic systems; differential games.

**E626 Game Theory (3 cr.)** P: E521, E621. Mathematical analysis of strategic interaction. Noncooperative games played once or repeatedly, with perfection or imperfect information. Necessary condition for a solution (equilibrium), as well as sufficient conditions (refinements). Cooperative games, such as bargaining and market games. Numerous applications, including experimental games.

**E627 Experimental Economics (3 cr.)** P: Intermediate microeconomics and statistics. Focuses on the use of laboratory experimental methods in applied microeconomics. Specific application areas will include the analysis of resource allocation

mechanisms for both private and public goods and individual choice under uncertainty using both human and nonhuman subjects.

**E628 Advanced Macroeconomic Theory (3 cr.)** P: E622 or equivalent. The course provides an in-depth treatment of major areas in macroeconomics, advancing to the several frontiers at which its theory is currently most tested. These include convergence to rational expectations equilibrium, near-rational solutions, non-Walrasian equilibrium, and the management of incentives and macroeconomic disturbances through contractual arrangements.

**E629 Open Economy Macroeconomics (3 cr.)** P: E622. Combines international finance and open-economy macroeconomics with history and current functioning of the international financial system and the policy and exchange regime choices of countries within it. Explorations include determinants of current-account balances and exchange-rate dynamics as well as implications of the international mobility of goods, financial services, and capital, international portfolio and direct investment behavior, and financial derivatives.

**E630 International Trade II (3 cr.)** P: E530. Second part of the graduate sequence in international trade. Focuses on analyzing strategic situations in an international context. Topics include imperfect competition in international trade, strategic trade policy, trade policy under incomplete information, and tariff and quota games.

**E641 Quantitative Studies in Labor Economics (3 cr.)** P: E541, E571, and at least concurrent registration in E572 or consent of instructor. Emphasis on the application of statistical and econometric theory and methods in the analysis of current issues in labor economics. The application of models involving discrete choice, search, screening, signaling, contracts, tournaments, and Markov processes to explain various labor market phenomena will be reviewed.

**E660 Public Economics I (3 cr.)** P: E621 or concurrent registration. Analysis of public expenditures and taxation from a microeconomic viewpoint. Topics include externalities, pure and impure public goods, efficiency and distributional effects of taxation, optimal taxation theory, benefit-cost analysis.

**E661 Public Economics II (3 cr.)** P: E660. In-depth analysis of selected aspects of public expenditures and taxation. Illustrative topics: intertemporal and aggregative effects of tax and expenditure policies, emphasizing saving and investment incentives; taxation of risky assets; taxation of imperfectly competitive industries; benefit-cost analysis under uncertainty; public choice.

**E671 Econometrics 3 - Nonlinear and Simultaneous Models (3 cr.)** P: E572 or equivalent. Introduction to econometric theory. Parameter estimation for single and multiple equation systems. Inference and hypothesis testing. Monte Carlo studies.

**E672 Macroeconometrics (3 cr.)** P: E671 or equivalent. Advanced topics in econometrics. Estimation of dynamic equation systems. Spectrum analysis. Problems of design for large

macroeconomic models.

**E673 Microeconometrics (3 cr.)** P: E572 or equivalent. Microeconomics with applications to labor, health, and public economics. Extensive coverage of limited dependent variable and panel data models. Empirical implementation is an essential component of the course.

**E685 Advanced Industrial Organization (3 cr.)** P: E585. Extends the coverage in E585. Provides greater in-depth coverage of contemporary industrial organization problems from a theoretical perspective and provides coverage of important industrial organization topics not discussed in E585. Topics include mechanism design, signaling and screening, merger theory, incomplete contracting and the firm, and antitrust and regulation.

**E698 Comparative Economics and Economics of Transition (3 cr.)** P: Consent of instructor. Modern approaches to analysis of nonmarket economic systems and mechanisms. Emphasis on the incentives generated by these mechanisms and information flows in the system. Since the field of comparative economics is both theoretical and institutional, students are required to read both analytical pieces containing formal models and descriptive papers.

**E713 Seminar in Economic History (3 cr.)** P: E529 or consent of instructor. Advanced topics in economic history (U.S. and European) with particular emphasis on recent debates in the literature of the new economic history. Application of economic theory and econometric techniques to historical problems.

**E724 Seminar in Economic Theory (3-6 cr.)** Advanced topics in business cycles, general equilibrium, growth, mathematical economics, and welfare economics. Offered periodically.

**E730 Seminar in International Trade (3 cr.)** Third part of the graduate sequence in international trade; intended for those writing theses in the field. Focuses on a deeper understanding of topics such as the political economy of protection, cooperation in repeated tariff games, trade negotiations, and multinational enterprises.

**E748 Seminar in the Economics of Labor and Human Resource Development (3 cr.)** P: E541 or consent of instructor. Selection from current issues in labor: labor markets, comparative labor economics, human capital, workforce planning, and labor relations.

**E752 Seminar in Money (3 cr.)** Current topics in advanced monetary and banking theory. Preparation of a research paper and oral presentation to a seminar.

**E762 Seminar in Public Economics (3 cr.)** Advanced topics in public economics. Preparation of a research paper and oral presentation to the seminar.

**E770 Seminar in Econometrics (3 cr.)** Advanced topics in econometrics in time series and/or cross-sectional data analysis.

**E785 Seminar in Industrial Organization (3 cr.)** Third course in the graduate industrial organization sequence; intended for those writing in the field. Topics include bargaining, reputation, oligopoly, research and development, vertical restraints, entry deterrence, transaction costs, and international industrial organization.

**E792 Workshops in Problems of Development (3 cr.)** In-depth study of specific underdeveloped area or specific topic in problems of underdevelopment.

**E793 Seminar in Planning Strategies and Techniques (3 cr.)**  
P: E591. Analysis of strategic choices and planning methods in Western economies and socialist economies in transition. Theory and practice of planning in underdeveloped countries.

**E800 Research in Economics (cr. arr.)\*\***

**E808 Thesis (M.A.) (cr. arr.)\*\***

**E809 Thesis (Ph.D.) (cr. arr.)\*\***

**E810 Readings in Economic History (1-6 cr.)\*\***

**E824 Readings in Economic Theory (1-6 cr.)\*\***

**E830 Readings in International Trade (1-6 cr.)\*\***

**E840 Readings in Economics of Labor and Human Resource Development (1-6 cr.)\*\***

**E850 Readings in Monetary Economics (1-6 cr.)\*\***

**E860 Readings in Public Economics (1-6 cr.)\*\***

**E870 Readings in Advanced Econometrics (1-6 cr.)\*\***

**E880 Readings in Industrial Organization (1-6 cr.)\*\***

**E890 Readings in Development and Economics of Transition (1-6 cr.)\*\***

\*\*These courses are eligible for a deferred grade.

**GRAD G590 Population Analysis: Concepts, Issues, Problems (3 cr.)** P: Graduate status or approval of instructor. Theoretical issues, empirical questions on social determinants and consequences of biological events such as birth and death. Age structure, marriage and household formation, gender, migration, quality of data, population policy in developing countries and advanced industrial societies. Contemporary and historical sources.

**GRAD G591 Methods of Population Analysis and Their Applications (3 cr.)** P: An undergraduate course in statistics. Techniques of measuring and analyzing population size and trends, fertility and mortality patterns, migration flows. Population estimates and projections. Major models of formal demography.

**GRAD G592 Topics in Population Research (3 cr.)** P: G590 and G591 or approval of instructor. Seminar-level course emphasizing class presentations, reviews of advanced literature, and the writing of research papers. Subject areas will include fertility, mortality, migration, economic demographic interrelations, mathematical demography, dynamics of small populations, and population projections.

**GRAD G593 International Perspectives on Population Problems (3 cr.)** International trends in population growth, characteristics, and structure with attention to major social, envi-

ronmental, economic, and political implications. Comparisons between industrially advanced economies and less-developed countries in Latin America, Africa, and Asia. Special emphasis will be placed on local and national circumstances affecting fertility, mortality, migration, and emerging roles of population policies in development planning.