GRADUATE STUDIES-ECONOMICS (GSE)

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GSE Courses

GSE 500. Independent Study. 1-4 units
Term Typically Offered: TBD
Prerequisite: Consent of department head.

Advanced study planned and completed under the direction of a departmental faculty member. Open only to graduate students demonstrating ability to do independent work. Enrollment by petition.

GSE 510. Essential Mathematics for Economic Analysis. 4 units
Term Typically Offered: SU
Prerequisite: Graduate standing. Recommended: MATH 206, MATH 244, MATH 408, or MATH 410.

Review and discussion of the basic math tools needed for graduate work in economics, including set theory, linear algebra, properties of functions, static and dynamic optimization. 4 lectures.

GSE 511. Microeconomic Analysis. 4 units
Term Typically Offered: F
Prerequisite: Graduate standing. Concurrent: GSE 510.

Preferences and choice, preferences over commodities, consumer demand theory, producer theory, choice under uncertainty, simultaneous and sequential move games, incomplete information games, mechanism and incentive design. 4 lectures.

GSE 512. Dynamic Stochastic Modeling. 4 units
Term Typically Offered: W
Prerequisite: GSE 511 and graduate standing.

Finite Markov chains, linear state space models, dynamic programming, rational expectations equlibrium, Markov perfect equilibrium, Stackelberg plans, general equilibrium under certainty and uncertainty, Arrow securities, consumption-based asset pricing, incomplete markets. 4 lectures.

GSE 518. Essential Statistics for Econometrics. 4 units
Term Typically Offered: SU
Prerequisite: Graduate standing. Recommended: MATH 206 or MATH 244 or GSE 510.

Statistical concepts for use in theoretical and applied econometric applications including random variables, independence, expectations, probability, distributions, covariance and correlation, large sample theory, and properties of estimators. 4 lectures.

GSE 519. Econometrics and Data Analysis. 4 units
Term Typically Offered: F
Prerequisite: GSB 518 or GSE 518. Corequisite: GSB 544 or GSE 524.

Identification and estimation of linear and nonlinear regression models for analyzing business data. Topics include multiple linear regression; model selection; robust standard errors; instrumental variables; maximum likelihood estimation; logit/probit, ordered logit/probit, and other microeconometric models. Course may be offered in classroom-based, online, or hybrid format. 4 lectures.

GSE 520. Advanced Econometrics I. 4 units
Term Typically Offered: F
Prerequisite: GSE 518 and graduate standing. Recommended: ECON 339.

The linear regression model. Confidence and prediction intervals. Hypothesis testing. The generalized regression model and heteroscedasticity. Identification and causal inference: randomization, regression, instrumental variables, regression discontinuity, differences in differences. 4 lectures.

GSE 522. Advanced Econometrics II. 4 units
Term Typically Offered: W
Prerequisite: GSE 520 and graduate standing.

Maximum likelihood estimation. Binary, multinomial, and ordered discrete response models. Truncated, censored regression. Structural equation modeling. Factor models, filtering and Bayes rule. Random utility and mixed logit models. Demand estimation. 4 lectures.

GSE 524. Computing and Machine Learning for Economics. 4 units
Term Typically Offered: F
Prerequisite: Graduate standing.

Use of computers for advanced data analysis in economics and analytics. Topics include computer programming using statistical software, data gathering and cleaning, and machine learning. 4 lectures.

GSE 526. Microeconometrics. 4 units
Term Typically Offered: W
Prerequisite: GSE 520 and graduate standing. Recommended: GSE 524.

Potential outcomes framework and causal treatment effects. Unconfoundedness designs, including matching and propensity score methods. Selection on unobservable designs. Quantile regressions. The econometrics of randomized experiments. 4 lectures.

GSE 532. Environmental and Natural Resource Economics. 4 units
Term Typically Offered: TBD
Sustainability Focused
Prerequisite: GSE 511 and graduate standing.

Economic analysis of pollution, congestion, public good provision, and natural resource conservation. Static and dynamic efficiency, economic growth and sustainability, pollution taxes, marketable permits, and the design of market-based regulations. 4 lectures.

GSE 534. International Economics. 4 units
Term Typically Offered: TBD
Prerequisite: GSE 511 and graduate standing.

Analysis of the international movement of goods, services, capital and payments. The role of exchange rates, tariffs, quotas, and transport costs. Relationship between international trade and economic growth. 4 lectures.

GSE 536. Public Economics. 4 units
Term Typically Offered: TBD
Prerequisite: GSE 511 and graduate standing.

Economic analysis of the rationale for public expenditure and taxation. Externalities, pollution and public policy, income redistribution and public welfare, public goods, collective choice and political institutions, public budgeting techniques and cost-benefit analysis, taxation and tax policy, state-local finance and fiscal federalism. 4 lectures.

GSE 538. Industrial Economics. 4 units
Term Typically Offered: SP
Prerequisite: GSE 511 and graduate standing.

Economic theories of industrial organization with specific reference to such topics as cartels, market concentration and performance, vertical integration, franchise contracts, ownership and control of firms, multipart and discriminatory pricing, and tie-in sales. Economic aspects of antitrust law and government regulation of industry. 4 lectures.

GSE 542. Advanced Labor Economics. 4 units
Term Typically Offered: SP
Prerequisite: GSE 522 and graduate standing, or consent of instructor. Recommended: GSE 526.

Research methods in labor economics and application of modern empirical techniques to the analysis of labor markets. Topics include labor supply and demand, discrimination, migration, and human capital accumulation. 4 lectures.

GSE 544. Evidence-Based Decision Analysis. 4 units
Term Typically Offered: SP
Prerequisite: GSE 520 and graduate standing. Recommended: GSE 524 and GSE 526.

Representing uncertainty using discrete and continuous conditional probabilities. Monte Carlo simulation of independent and correlated random variables. Optimization of decision variables. Randomization in program evaluation. Model mis-specification. Visualization and representation of the results of a decision analysis. Case studies. 4 lectures.

GSE 546. Incentives and Market Design. 4 units
Term Typically Offered: SP
Prerequisite: GSE 511 and graduate standing.

Ascending, first-price, second-price, and double auctions. Revenue equivalence, multi-unit auctions, the Vickrey-Clarke-Groves mechanism, and matching markets. The deferred acceptance algorithm, the immediate acceptance algorithm, and the many-to-one matching model. 4 lectures.

GSE 552. Machine Learning for Prediction and Causal Inference. 4 units
Term Typically Offered: SP
Prerequisite: GSE 526 and graduate standing.

Regularization, model selection, and supervised and unsupervised learning. Post model selection inference for causal effects. Double/debiased machine learning, causal trees, casual forests, and synthetic controls. 4 lectures.

GSE 570. Selected Advanced Topics. 1-4 units
Term Typically Offered: TBD
Prerequisite: Graduate standing or consent of instructor.

Directed group study of selected topics for graduate students. Open to undergraduate and graduate students. The Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures.

GSE 580. Seminar in Economics. 1-4 units
Term Typically Offered: TBD
Prerequisite: Graduate standing.

Advanced topics in economics chosen according to the common interests and needs of the students enrolled. The Class Schedule will list topic selected. 1 to 4 seminars. Total credit limited to 5 units.

GSE 599. Thesis. 4 units
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of thesis committee.

Individual research under the general supervision of the faculty, leading to a graduate thesis of suitable quality. Minimum of 8 units required for degree.