**GRADUATE STUDIES-ECONOMICS (GSE)**

**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, or MATH 408.
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: Concurrent enrollment in GSE 510 and graduate standing.
Basic microeconomic theory including theory of the firm, consumer theory, general equilibrium, capital theory, and welfare economics. 4 lectures.

**GSE 512. Macroeconomic Analysis. 4 units**
Term Typically Offered: W
Prerequisite: GSE 511 and graduate standing.
Basic macroeconomic theory including markets for commodities and credit, the demand for money, market-clearing and the labor market, inflation and interest rates, investment, real business cycles and unemployment, economic growth, government consumption and the role of public services, and taxes, transfers, and the public debt. 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 520. Advanced Econometrics I. 4 units**
Term Typically Offered: F
Prerequisite: GSE 518 and graduate standing. Recommended: ECON 339.
The use of statistical procedures to measure theoretical economic relationships and to verify and reject theories. Advanced coverage of regression analysis and hypothesis testing. 4 lectures.

**GSE 522. Advanced Econometrics II. 4 units**
Term Typically Offered: W
Prerequisite: GSE 520 and graduate standing.
Use of statistical procedures to deal with simultaneous equations, limited dependent variables and time-series data. Includes methods of instrumental variables, generalized method of moments and maximum likelihood. 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.
Variety of standard and advanced econometric techniques employed in applied microeconomics. Emphasis on when and how to apply appropriate techniques. 4 lectures.

**GSE 532. Environmental and Natural Resource Economics. 4 units**
Term Typically Offered: TBD
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.  


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.