This course is designed for first-year students with a strong background in statistical theory and second year students who have taken Econometrics II (Econ 551). The aim of the course is to provide a theoretical background that is useful for research in econometric methods. The topics covered in this course are: (i) the basic linear model, including a review of relevant linear algebra and projection material (not covered in class), some optimality results of least squares (including loss and risk functions, sufficient statistics, and completeness), and finite sample testing results, (ii) some asymptotic theory not covered in econometrics I (Econ 550), (iii) consistency of extremum estimators—least squares, maximum likelihood, generalized method of moments, (iv) asymptotic normality of extremum estimators, (v) testing in nonlinear models (Wald, likelihood ratio, and Lagrange multiplier tests) and specification tests, (vi) parametric and nonparametric identification, with emphasis on the recent advances in nonparametric identifiability results, and (vii) basic nonparametric estimation techniques, such as kernel estimation, and various semiparametric estimators.

Additional topics that will be discussed as time permits are: (viii) the bootstrap, (ix) simulation estimation, and (x) weak instruments.

**Semester offered:** Spring

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