Econ 554b Econometrics V: Topics in Semi-nonparametrics and Robust stochastic programming

**Day / time:** Friday 2:00-4:30  
**Course Type:** Graduate  
**Course term:** Spring  
**Instructor(s):** Xiaohong Chen  
**Location:** Rm. B1

Semi-nonparametric models and methods are active research subfields in econometric theory and are becoming increasingly important in applied economics. This is because the flexibility of non- and semiparametric modelling provides important robust ways to investigate complex problems in diverse fields, and also because the availability of larger data sets and faster computing.

This course intends to cover two leading semi-nonparametric methods: sieves and penalization. Both methods have been widely applied to estimation, testing and model selection of diverse semi-nonparametric economic models, such as those in empirical labor, consumer theory, industry organization, game theory, program evaluation, non-classical measurement error, latent factor, missing data, empirical finance, nonlinear time series, panel, spatial and networks, etc.

The methods of sieves and penalization are optimization-based and belong to the rapidly expanding Machine Learning (ML) family. For example, the neural networks is one particular nonlinear sieve that is regaining hypes in ML community. While theoretical and applied econometricians have mostly focused on linear sieve (i.e., series) method in the past, nonlinear sieves such as neural networks have better performance in estimation and testing of models with high-dimensional variables. This course will pay greater attention to inferential theories that are applicable to nonlinear sieve approximated models, especially models with nonparametric endogeneity or/and latent heterogeneity.

Distributionally robust stochastic programming is an important optimization method with random constraint sets. Stochastic linear and convex programming are increasingly popular in ML, operation research and econometrics. This course will also cover some recent inferential results on minimax stochastic programming.

The prerequisite for this course is Econometrics I and II (or III). Additional tools will be developed as needed.

**Semester offered:** Spring  
**Course Description:** Course Description

---

**Source URL:** https://economics.yale.edu/graduate/courses/econ-554b-econometrics-v-topics-semi-nonparametrics-and-robust-stochastic