Professor Robert A. Miller
Carnegie Mellon University
47-812 Econometrics II
Mini 2 2026

SYLLABUS

Overview
This course analyzes the structural estimation and testing of nonlinear models. It has four segments:

1. The first four lectures give a flavor of structural estimation, by showing how some examples of economic models induce a data generating process that provides the basis for estimating the structure of the economic environment, critical for conducting counterfactual simulations. We introduce the estimation of dynamic models with continuous choices, models with discrete choices and models with both continuous and discrete choices.
2. The next three lectures profile many estimators that have been used to summarize data. They can be placed into four categories: estimators for linear data generating processes, parametric nonlinear processes, plus nonparametric and semiparametric estimators.
3. Almost all inference is based on the laws of probability, so it is hard to understand modern econometrics without a basic knowledge of probability theory, including laws of large numbers and central limit theorems. The purpose of the two lectures on probability theory is to introduce these concepts.
4. The rationale for the last segment is that the exact distribution of most nonlinear estimators is intractable. This explains why we resort to large sample theory. In the final three lectures we derive the asymptotic distribution of several nonlinear estimators and show how to conduct hypothesis tests.

Assessment
There is a final in class examination (25 percent), the same final as a take-home (25 percent) and five assignments (10 percent each). The assignments include a heavy dose of computational and empirical work, and the closed book final exam tests your understanding of the lecture material. The final examination will be held on Wednesday December 2, while the (look alike) take home is due Wednesday December 9. You should form a study group as soon as possible. You may turn in one assignment per study group, but study groups must consist of one to three members (but no more; you will be asked to split up).

Lectures, tutorials and assignments
They are posted on the course website.