

- White, H. (1984), *Asymptotic Theory for Econometricians*. Academic Press

INSTRUCTOR: [Miguel A. Delgado](#)

TEACHING ASSISTANT: Rui Cui

DESCRIPTION:

This course provides the probability and statistics background for Econometrics II as well as the rest of quantitative courses taught in our Ph.D. program. The course assumes that the student has knowledge of Calculus, Algebra and Statistics needed for standard Econometrics courses at a Bachelor level.

TEXTBOOK:

Parts I and II of the course follows closely Parts I and II of the textbook.

Shao, J. (2003): *Mathematical Statistics*. Springer. Slides-1, Slides-2

Solved problems can be found in:

Shao, J. (2005) *Mathematical Statistics: Exercises and Solutions*. Springer.

Part III of the course is based on

Hayashi, F. (2000): *Econometrics*. Princeton University Press.

SYLLABUS:

PART I: PROBABILITY THEORY

- 1.- Probability spaces and random elements.
- 2.- Integration and differentiation.
- 3.- Distribution and its characteristics.
4. - Conditional expectations.
- 5.- Asymptotic theorems.

PART II: STATISTICAL INFERENCE

- 1.- Population, sample and moments.
- 2.- Statistical inference.
- 3.- Asymptotic criteria and inference.
- 4.- Estimation in parametric models.
- 5.- Hypotheses tests.

PART III: LINEAR MODEL

1. Modeling linear and nonlinear relations.

2. Finite sample inferences using OLS and ML.
3. Asymptotic inferences.
4. Identification and misspecification.
5. GMM/IV estimation.

SOME REFERENCE TEXTBOOKS IN STATISTICS

- Ash, R. (2000), Probability and Measure Theory, 2nd Edition. Academic Press.
- Bickel, P.J. and K.A. Doksum (2001): Mathematical Statistics, vol. 1,2. Prentice-Hall.
- Bierens, H. (2004), Introduction to the Mathematical and Statistical Foundations of Econometrics. Cambridge.
- Casella, R. and J. Berger (2002), Statistical Inference, 2nd Edition. Duxbury.
- Chow, Y.S. and H. Teicher (1997): Probability Theory, Springer.
- Cramer, H. (1946), Mathematical Methods of Statistics. Princeton.
- Davidson, J. (1994): Stochastic Limit Theory, Oxford Economic Press.
- Fuller, W. (1996), Introduction to Statistical Time Series, 2nd Edition. Wiley.
- Jacod, J. and P. Protter (2003), Probability Essentials. 2nd Edition, Springer.
- Lehman, E.L. (2004): Elements of Large-Sample Theory, Springer.
- Lehman, E.L. and Casella, G. (2001): Theory of Point Estimation, Springer.
- Lehman, E.L. and Romano, J.R. (2005): Testing Statistical Hypothesis, Springer.
- Mittelhammer, R. (1992), Mathematical Statistics for Economics and Business. Springer-Verlag.
- Mood, A., F. Graybill., and D. Boes (1974), Introduction to the Theory of Statistics. McGraw Hill.
- Rao, C.R. (1973): Linear Statistical Inference and its Applications. Wiley.
- Rohatgi, V. (1984), Statistical Inference. Dover.
- Serfling, R. (1980), Approximation Theorems of Mathematical Statistics. Wiley.

SOME REFERENCE TEXTBOOKS IN ECONOMETRICS

- Amemiya T. (1985) Advanced Econometrics, Harvard University Press.
- Dhrymes, P.J. (2000), Mathematics for Econometrics. Springer.
- Davidson, R. and J.M. Makinnon (1993), Estimation and Inference in Econometrics, Oxford University Press.
- Gourieroux C. and A. Monfort (1995), Statistics and Econometric Models, Vol. 1 and 2, Cambridge University Press.
- Johnson J. and J. Dinardo (1997), Econometric Methods, MacGraw-Hill.
- Greene W. (1997), Econometric Analysis, Pearson -Prentice Hill.
- Mittelhammer, R.C., G.G. Judge and D.J. Miller (2000), Econometrics Foundations, Cambridge University Press.
- Ruud P. (2000), An introduction to Classical Econometric Theory, Oxford University Press.
- White, H. (1984), Asymptotic Theory for Econometricians. Academic Press.

EVALUATION

3 quizzes + 3 sets of problems to be handled in the day of the quiz: 45%

Final exam: 55%

ASSIGNMENTS

Assigned problems from Shao book due the first quiz day:

Chapter 1: 5, 10, 12, 30, 31, 34, 36, 37, 40, 45, 46, 50, 51, 52, 55, 56, 65, 70, 74, 78, 83, 85, 86, 91, 98, 99

Assigned problems from Shao book due the second quiz day:

Chapter 1: 118, 121, 122, 128, 137, 140, 144, 146, 152, 154, 156, 161, 164.

Chapter 2: 9, 13, 19, 22, 67, 68, 82, 83, 84, 92, 97, 98, 99, 101,

Assigned problems from due the third quiz day:

From Shao book:

Chapter 2: 105, 111, 105, 111, 116, 119, 121, 125, 126, 129, 130.

Chapter 3: 101, 103, 107, 110.

Chapter 4: 96, 119, 120, 131, 143, 144, 151

Chapter 6: 48, 51, 71, 92, 95, 98, 99.

From Hayashi book:

Chapter 1: 4, 5, 6, 7.

Chapter 2: 6, 7, 8, 12