University of Colorado - Department of Economics
Econ 8828 - Seminar in Econometrics - Fall 2015
Professor Carlos Martins-Filho

O ce.   Economics Building 105

Meetings.   Tuesdays and Thursdays from 2:00 PM - 3:15 PM in ECON 5.

O ce hours.   Tuesdays 3:15 PM - 5:15 PM and by appointment. For appointment send an email to carlos.martins@colorado.edu.

Class URL.   http://spot.colorado.edu/ martinsc/Econ _8828.html

Prerequesites.   ECON 7828 (or equivalent) or consent of instructor.

Objectives.   This is the rst course of the sequence Econ 8828-8838. This sequence is the core of a Ph.D. eld in Econometrics. The course objectives are:

2. Davidson, R. and MacKinnon, J. G., 2003, Estimation and Inference in Econometrics, Oxford University Press.

3. Newey, W. and McFadden, D., 1994, Large sample estimation and hypothesis testing. In Handbook of Econometrics IV, R. Engle and D. McFadden Editors, Chapter 36.

4. Tsybakov, A., 2009, Introduction to Nonparametric Estimation, Springer, New York.

5. van der Vaart, A., 1998, Asymptotic Statistics, Cambridge University Press, Cambridge.

6. I will distribute class notes. Read them carefully. They reflect my view of what are the most important concepts and results we cover in the course.

Topics.

1. Probability

    (a) Probability spaces
    (b) Continuity of probability measures
    (c) Conditional probability, independence and Bayes Theorem
    (d) Borel-Cantelli Lemma
    (e) Construction of probability measures: and   systems, Dynkin's Theorem
    (f) The distribution function induced by a probability measure

2. Random elements

    (a) Measurable functions and random elements
    (b) Probability measures induced by random elements
    (c)   -algebras generated by random variables
    (d) Independent random variables

3. Expectation

    (a) Measurability Theorem
    (b) Expectation of simple functions and extensions to general functions
    (c) Properties of expectations
         i. Monotone convergence theorem
        ii. Inequalities: Modulus, Markov's, Chebyshev's
        iii. Dominated convergence theorem
    (d) Riemann vs. Lebesgue integral
    (e) Product spaces and joint measures
    (f) Conditional expectation
    (g) Radon-Nikodym derivative

4. Convergence

    (a) Almost sure convergence
    (b) Convergence in probability
    (c) L_p convergence

    (d) Uniform integrability

    (e) Moment inequalities: Schwartz's, Holder's, Minkowski's, Jensen's, Lyapounov's

    (f) Convergence in distribution

        i. Schee's Lemma

        ii. Skorohod's Theorem

        iii. Delta method and the Continuous Mapping Theorem

        iv. Characteristic functions: uniqueness and continuity theorems

        v. Portmanteau Theorem

    (g) Weak Law of Large Numbers for IID sequences

    (h) Central Limit Theorem for IID sequences

    (i) Convergence of Moments

    (j) Lindeberg-Feller Theorem

5. Parametric models

    (a) Identi cation

    (b) Loss functions and Extremum (M) estimation

        i. Linear and nonlinear least squares (LS)

        ii. Maximum likelihood (ML)

        iii. Method of moments (MM)

        iv. Minimum distance (MD)

    (c) Z-estimation

    (d) Consistency: LS, ML, MM, MD

    (e) Stochastic equicontinuity and uniform convergence

    (f) Asymptotic Normality: LS, ML, MM, MD

    (g) Estimation of Covariances of Asymptotic Distributions

    (h) Asymptotic E ciency

    (i) Feasible estimation

    (j) Two-Step estimation

6. Hypothesis testing for parametric models

    (a) Basic concepts: level, asymptotic power functions, relative e ciency

    (b) Likelihood ratio tests

    (c) Wald and Score tests

7. Nonparametric and semiparametric models

    (a) Kernel density and distribution estimation

    (b) Kernel regression estimation

    (c) Partially linear regression models

Important information.

If you qualify for accommodations because of a disability, please submit a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail dsinfo@colorado.edu.

If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with me.

Campus policy regarding religious observances requires that faculty make every e ort to reasonably and fairly deal with all students who, because of religious obligations, have con icts with scheduled exams, assignments or required attendance. In this class, if the midterm, nal or homework due dates prevent/inhibit you from exercising your rights to religious observance, please inform me by August 28, 2012 so that reasonable accommodations can be made.

See full details at www.colorado.edu/policies/fac.relig.html.

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with di erences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an al-ternate name or gender pronoun. Please advise me of this preference early in the semester so that I may