Econometric Theory II: Core Topics (details on the panel data module will follow)

TIME: 9:30-10:45 Tuesday-Thursday Stadium 1214

Instructor: Marco Costanigro   **Contact:**
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                                                      Email: marco.costanigro@colostate.edu
TA: Siwen Zhou   Email: siwen.zhou@colostate.edu

Office Hours :   Marco: Tuesday 2:00-3:00 pm and by appointment (PM hours)
                        Siwen: Tuesday 3:30 to $:30, Clark B 302.

Texts: **Required:** Microeconometrics: Methods and Applications by A.C Cameron and P.
                K Trivedi Cambridge University Press. 2005. ISBN: 0521848059

                Suggested: Econometrics Analysis (sixth edition) by William Greene. Prentice Hall.
                ISBN: 0135132452

                Suggested: Microeconometrics Using Stata, Revised Edition. by A.C Cameron and
                P. K Trivedi ISBN: 1597180734

Objectives:

1. Expand students' fundamental knowledge of econometric core methods beyond the classical
   linear model to include fully parametric, semi-parametric and non-parametric estimation methods.

2. In addition to technical proficiency, students will gain an understanding of the implications of the
   assumptions inherent to alternative estimators and modeling approaches; and the ability to use
   theory, sample and out of sample information to make appropriate methodological decisions

3. Students will acquire the broad foundation necessary to independently consult, comprehend and
   use advanced econometric models not explicitly treated in class.

Homework Exercises
I will assign homework exercises over the first 10 weeks of course. I try to have one homework for each
teaching module. You may work in groups of *up to 4 people*. If you choose to work in a group, which is
highly encouraged, please submit only one copy of each assignment with the names of the participants on
the front.

Computer Software:
No specific econometric software is mandated, but homework assignments will imply the joint use of
"canned" software (e.g. STATA, or R) and a matrix environment software (e.g. Gauss or MATA).
While I will provide some basic guidance, I expect students to use manuals and online help to self-
teach the use of the chosen statistical software. Most of the examples presented in my notes use
STATA, but I will start updating them to include R code this semester (but no promises made!)

<u>Exams</u>: This is a two credits course, concluded at the beginning of April. The first exam will be at mid-course. The second exam (comprehensive) will be one week after the end of the course (perhaps outside of class hours). I will discuss options with the class over the course of the semester.

<u>Course Evaluation</u>:
As a default, the grades are as assigned as follows: A = ≥ 90%; B = 80-89%; C = 70-79%; D = 60-69%; F = < 60%. Pluses and minuses will be used at the discretion of the instructor.

Grading
Rule A
    Group Homework Exercises   30%
    Exam I (75 min)   35%
    Exam II (comprehensive, 2hours)   35%
Rule B
    Group Homework Exercises   30%
    Exam II (comprehensive, 2hours)   70%

I will use the highest score from calculating both Rule A and Rule B

Tentative course Timeline (subject to change at the discretion of the instructor)

Week	Date	Class	Topic
		1	Matrix review and Properties of Estimators
1	1/21/2020	2	Extremum estimator and NLS
		3	Extremum estimator and NLS
2	1/28/2020	4	Maximum Likelihood Estimation
		5	Maximum Likelihood Estimation
3	2/4/2020	6	Maximum Likelihood Estimation
		7	Quasi-MLE and Sandwich Estimator
4	2/11/2020	8	Quasi-MLE and Sandwich Estimator
		9	Quasi-MLE and Sandwich Estimator
5	2/18/2020	10	Numerical optimization
		11	**Exam 1**
6	2/25/2020	12	Numerical optimization
		13	Methods of Moments
7	3/3/2020	14	Methods of Moments
		15	Methods of Moments
8	3/10/2020	16	Wald, LM, LR tests
		-	Spring Recess
9	3/17/2020	-	
		17	Power, sample size , pitmann-drift (if time allows)
10	3/24/2020	18	Nonparametrics
		19	Nonparametrics and concluding remarks
11	3/31/2020	20	Catch up and review/**Exam 2**

Table of references

Topic	C&T	Micro with Stata	Greene
Estimation Frameworks in Econometrics			Chapter 14
Properties of Estimators (MJM E.2.1.4-5-6-7)			
Extremum Estimators	5.3 (124)		
Nonlinear Least Squares	5.8.1 (151)	10.3.5 (325)	
Maximum Likelihood	5.6		
Numerical Methods		11	
Testing	7		
GMM	6		
Nonparametrics	9		

Course Policies

1. **Homework exercises** are due on the stated due date. Beyond that, no assignments will be accepted.
2. If you are a student who will need **accommodations** in this class due to a **disability or chronic health condition**, please make an appointment with me to discuss your individual needs. Any accommodation must be discussed in a timely manner prior to implementation. A verifying accommodation letter from Resources for Disabled Students is required before any accommodation is provided. Student Disability Center https://disabilitycenter.colostate.edu/ located in TILT, room 121 or via phone 970-491-6385.
3. **Academic integrity** is expected. This course will adhere to the CSU Academic Integrity Policy as found on the Student' Responsibilities page of the **CSU General Catalog** and in the Student Conduct Code**.** Violations will result in a report to the Office of Conflict Resolution and Student Conduct Services, and the full application of all relevant University policies.
4. Always show appropriate **respect** for your instructor and fellow students. This means, among other things, that **cell phones** should be muted prior to class.
5. **Sexual Assault and Violence Elimination.** CSU's Student Sexual Harassment and Violence policy, following national guidance from the Office of Civil Rights, requires that professors follow CSU policy as a "mandatory reporter" of any personal disclosure of sexual harassment, abuse, and/or violence related experiences or incidents shared with the professor in person, via email, and/or in classroom papers or homework exercises. These disclosures include but are not limited to reports of personal relational abuse, relational/domestic violence, and stalking. While professors are often able to help students locate appropriate channels of assistance on campus (e.g., see the CSU Health Network link below), disclosure by the student to the professor requires that the professor inform appropriate CSU channels to help ensure that the student's safety and welfare is being addressed, even if the student requests that the disclosure not be shared.
6. For counseling support and assistance, please see The CSU HEALTH NETWORK, which includes a variety of counseling services that can be accessed at: http://www.health.colostate.edu/. And, The Sexual Assault Victim Assistance Team is a confidential resource for students that does not have a reporting requirement and that can be of great help to students who have experienced sexual assault. The web address is http://www.wgac.colostate.edu/support

Principles of Community

The Principles of Community support the Colorado State University mission and vision of access, research, teaching, service and engagement. A collaborative, and vibrant community is a foundation for learning, critical inquiry, and discovery. Therefore, each member of the CSU community has a responsibility to uphold these principles when engaging with one another and acting on behalf of the University

Inclusion:

We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents, and contributions.

Integrity:

We are accountable for our actions and will act ethically and honestly in all our interactions.

Respect:

We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.

Service:

We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.

Social Justice:

We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.