UNIVERSITY OF MARYLAND
Department of Economics

Part A: Guido Kuersteiner       Econ 722
Part B: Ingmar R. Prucha       Spring 2023

Lecture: Part A, Tu 5:00-7:30pm TYD 0102 (if the course needs to be moved online Zoom links will be provided). The lecture on February 21 will be moved to Thursday February 23.
Part B, Tu 5:00-7:30pm (if the course needs to be moved online Zoom links will be provided).

If needed, some lectures may be shifted to Th 5:00-7:30pm

Kuersteiner Office: Tydings Hall 3145
gkuerste@umd.edu
http://econweb.umd.edu/~kuersteiner/
Office Hours: Tu 11:30am-12:30pm (and by appointment)

Prucha Office: Tydings Hall 3147A
prucha@umd.edu
http://econweb.umd.edu/~prucha/
Office Hours: Tu 2-4pm (and by appointment)

Course Website
Part A: All course related materials are posted on ELMS. Grades for the midterm exam are posted on ELMS. The graded midterm exam can be viewed upon sending an email request to Prof. Kuersteiner.
Part B: Most course related material will be made available on Prof. Prucha’s teaching web site http://econweb.umd.edu/~prucha/econometricsIV_Part2.html.
Please send an email to Prof. Prucha for login/password information.

Course Communication
Part A: You should check the course web-site regularly for new material. You will receive information about problem sets and materials posted on the web-site from a Google group email list.
Part B: Email will be used as needed for course communication.

Emergency Protocol
In case the university closes for weather related or other emergencies, lectures will be held virtually by Zoom if feasible. Exams will also be conducted as remote Zoom session if physical locations on campus are unavailable during the announced exam times.
COURSE OVERVIEW

Part A of the course will cover the following topics
- Binary Response Models
- Multinomial Response Models
- Series Estimation
- Machine Learning
- Semiparametric Inference using Series and ML

Part B of the course will cover the following topics
- Quantile Regression
- Non-parametric and Semi-parametric Estimation Methods
- Spatial and Social Interaction Network Models
- Dynamic Panel Data Models
- Weak Instruments
- Cluster and Stratified Sampling (if not covered elsewhere)
- Bootstrap and Jack Knife methods (if time permits)

COURSE AIMS

The course is oriented to provide students with a rigorous and broad knowledge of econometric methods especially important for conducting empirical research in micro-economics. The course is not geared towards training econometric theorists, although this course would be necessary training for such a specialization. In particular, the aim of the course is to provide students with the necessary tools to (i) read intelligently all empirical research (with a proper understanding of the underlying methodology of inference), and (ii) to conduct empirical research suitable for publication in any economics or econometrics journal. The course builds on Econometrics I and II, and complements Empirical Microeconomics.

ASSUMED REQUIREMENTS

Students are assumed to have knowledge of the material covered in Econometrics I and II.

PRINCIPAL TEXTS

Cameron, A.C., and P.K. Trivedi, Microeconometrics, Methods and Applications, Cambridge, 2005.
SUPPLEMENTARY TEXTS


PROBLEM SETS

Part A of the course includes a set of optional problem sets that offer training in the computational implementation of the methods discussed in the course. ‘Optional’ means that problem sets are not graded, do not have to be handed in or done at all and that solutions may not always be provided.

For some problem sets there are solutions in the form of Python code. Some resources for Python are listed below. Python is available as an open source, freely downloadable software development environment and programming language. There are over 10,000 add on packages available for the language, including packages with machine learning subroutines such as scikit-learn and PyTorch. Anaconda is an integrator software that integrates a large number of the Python packages and handles installation and updating. The latest currently available language version for Python is 3.11. However, my preferred IDE Spyder currently only supports Python 3.9. If you are using Spyder, you need to make sure to read the corresponding tutorials and reference texts for the correct Python version. There are some interesting language extensions in Python 3.10 that are currently not available with Spyder.

General:

https://www.python.org/ for software downloads, tutorials and language reference. Python 3.10 and Python 3.11 distributions are available from this web-site but using them may require more effort installing a workable software distribution.

Integrated Development Environments (IDE):

Note that the Anaconda distribution contains the Spyder IDE as well as scikit-learn. The package PyTorch can be installed through the Anaconda.Navigator interface which comes with the Anaconda distribution.

https://www.anaconda.com/
https://www.spyder-ide.org/

Machine Learning Packages:

https://scikit-learn.org/stable/
https://pytorch.org/
Language Tutorials:

https://docs.python.org/3.9/tutorial/index.html

Books:

Part B of the course will likely include optional problem sets intended for a deeper understanding of the course material. ‘Optional’ means that problem sets are not graded, do not have to be handed in or done at all and that solutions may not always be provided.

GRADING POLICY

The final grade in Econ 722 will be based on the performance in Part A and B of the course, each component getting equal weights:

Part A: Exam 50.0%*
Part B: Exam 50.0%*

* No makeup exams will be given except in cases of illness (confirmed by a doctor’s certificate), religious observance, participation in University activities at the request of the University authorities, or compelling circumstances beyond the student's control. If at all possible, the student must inform me (or the Economics Department) of her/his situation before the exam.

In case the University is closed during (part of) the official scheduled time period for the final exam, the exam will be rescheduled according to the instructions that will be given by the University in that eventuality.

MIDTERM EXAM: Thursday, March 30, 2023, take home exam.
FINAL EXAM: Thursday, May 18, 2023, 4-6pm

UNIVERSITY AND GRADUATE SCHOOL RULES AND REGULATIONS:

University policies can be found here: https://policies.umd.edu/
In particular:
- https://policies.umd.edu/general-administration/university-of-maryland-policy-and-
procedures-on-sexual-harassment-and-other-sexual-misconduct
- https://policies.umd.edu/research/university-of-maryland-intellectual-property-policy

All graduate school policies can be found here: https://gradschool.umd.edu/course-related-policies

In particular note the following items:

**Academic Integrity**

The student-administered University Honor Code and Honor Pledge (shc.umd.edu/code.html) prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents and forging signatures.

Compliance with the code is administered by the Student Honor Council, which strives to promote a community of trust on the College Park campus.

University policy of the Code of Academic Integrity, including procedures that handle violations can be found here: https://president.umd.edu/administration/policies/section-iii-academic-affairs/iii-100a

**COPYRIGHT PROTECTION FOR CLASS MATERIALS**

The lecture class and all other course materials that exist in a tangible medium, such as written or recorded lectures, Power Point presentations, handouts and tests, problem sets and solutions, are copyright protected. Students may not copy and distribute such materials except for personal use and with the instructor’s permission. Obtaining and using such materials from courses taught in previous years without the instructor’s explicit permission constitutes a copyright breach. In addition, unauthorized use of video or audio recordings may be in violation of state and federal law.

**ATTENDANCE**

By signing up for this class you agree to exam formats, course requirements and timing of exams and due dates of work to be handed in. Attendance in all lectures is expected except when excused for health or other reasons permitted by university policies. Absences need to be reported by email to the instructor at least one hour before class.

**HEALTH AND MASK MANDATES**

Covid related policies: https://umd.edu/4Maryland
STUDENTS WITH DISABILITIES

UMD guarantees appropriate accommodations for students with disabilities. If you require accommodations, please contact me as soon as possible. If you need further clarification, the link to ADS is: https://www.counseling.umd.edu/ads/

COURSE EVALUATIONS

Students are encouraged to submit course evaluations through CourseEvalUM (www.courseevalum.umd.edu).

READING LIST FOR PART A

Binary Choice Models
*Wooldridge Chapter 15
Cameron and Trivedi Chapter 14


Multinomial Response Models
*Wooldridge Chapter 16
Cameron and Trivedi Chapter 15


**Series and Sieve Estimation, Semiparametric Inference, Nonlinear Instrumental Variables**


**Machine Learning Algorithms**


Buhlmann, P. and van de Geer, S. Statistics for High-Dimensional Data, Springer 2011


Amann, N. and U. Schneider (2021): Uniform Asymptotics and Confidence Regions Based on the Adaptive Lasso With Partially Consistent Tuning.

Applications of Series Estimators and Machine Learning


READING LIST FOR PART B

Nonparametric and Semiparametric Estimation

Prucha, I.R., Handout on Nonparametric and Semiparametric Estimation

Below is a list of some texts and review articles. References to research articles are given in the handout.

Cameron, A.C., and P.K. Trivedi, 2005, Microeconometrics, Methods and Applications, Cambridge University Press, Cambridge, Ch. 9.


**Spatial/Cross Sectional Interaction Models**

Prucha, I.R., Handout on Estimation of Spatial Models

_Below is a list of some texts and review articles. References to research articles are given in the handout._


**Below are some recent articles that explicitly connect spatial and social interaction models**


**Quantile Regression**

Prucha, I.R., Handout on LAD and Quantile Regression

**Below is a list of some texts and review articles. References to research articles are given in the handout.**


A more extended treatment of the subject is now also available:


**Weak Instruments**

Prucha, I.R., Handout on Weak Instruments
Below is a list of some review articles. References to research articles are given in the handout.


**Dynamic Panel Data Models**

Prucha, I.R., Handout on Panel Data Models

Below is a list of some texts and reviews. References to research articles are given in the handout.

Arellano, M., 2003, Panel Data Econometrics, Oxford University Press, Part III.


