ECO 387
Advanced Econometrics
Spring 2020, M–W 8:30am-10:30am, PH 206

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Office Location: PH 300S
Office Hours: T–Th 3:00pm-4:45pm
Course website: Blackboard

Course Description: This course is the second semester of a two-semester econometrics sequence designed for the quantitative economics major. The main objective has two aspects. Firstly, the course will introduce students to the computational aspects of econometric analysis using Python and R. This will complement the theoretical aspect of the course, which is to continue building on the regression analysis of the first semester, and introduce a number of important extensions. Topics will include static panel data models, instrumental variable methods and basic analysis of time series data. Upon completion of the course, students will have a sufficient background to read and produce empirical work using econometric techniques.

Course Objectives: This course promotes student learning in various ways. Students will get familiar with

1. data types, objects in Python and R,
2. control structures and custom functions in Python and R,
3. data frames and graphics in Python and R,
4. classical linear regression analysis using Python and R,
5. static panel data models such as one-way and two-way error models,
6. endogeneous regressor problem, instrumental variable approach,
7. time series models, forecasting and evaluation of forecasting performance.

Prerequisites: Math 241, Eco 382.

Supplementary Readings:

James H. Stock and Mark W. Watson. *Introduction to Econometrics*. Pearson, 3rd edition, 2011. ISBN 99780138009007.

Hans Petter Langtangen. *A Primer on Scientific Programming with Python*. Springer, 5th edition, 2016.

Kevin Sheppard. Introduction to python for econometrics, statistics and numerical analysis. 2018. URL https://www.kevinsheppard.com/images/b/b3/Python_introduction-2016.pdf.

Jake VanderPlas. *Python Data Science Handbook: Essential Tools for Working with Data*. O'Reilly Media, California, 2017.

John M. Chambers. *Software for Data Analysis: Programming with R*. Springer, New York, 2008. URL http://statweb.stanford.edu/~jmc4/Rbook/.

M.J. Crawley. *The R Book*. Wiley, 2nd edition, 2007. URL http://www.bio.ic.ac.uk/research/mjcraw/therbook/.

W. N. Venables, D. M. Smith, and the R Core Team. An introduction to R. 2019. URL https://cran.r-project.org/doc/manuals/R-intro.pdf.

Grading:

Problem Sets	Various due dates	30%
First Exam	due Monday, 23 March 2020	25%
Second Exam	due Monday, 11 May 2020	25%
Participation		20%

If the circumstances so demand, these descriptions and time lines are subject to change at the discretion of the Professor.

Letter Grade Distribution:

>= 93.00	A		73.00 - 76.99	C
90.00 - 92.99	A-		70.00 - 72.99	C-
87.00 - 89.99	B+		67.00 - 69.99	D+
83.00 - 86.99	B		63.00 - 66.99	D
80.00 - 82.99	B-		60.00 - 62.99	D-
77.00 - 79.99	C+		<= 59.99	F

Course Policies:

- **Problem Sets**

  - Weekly problem sets (PS)/assignments will be posted on Blackboard. You will submit your answers in class (not via emails) when the specific PS/assignment is due. You may work together. Also, examples (from the textbook) may be preassigned to each student and you will be asked to explain and comment on the examples during the class, as we cover the class material each week. So, it is your responsibility to read the chapters beforehand and come to class prepared.
  - **No late assignments will be accepted under any circumstances**.

- **Exams**

  - The first exam will cover the material presented in the classes prior to the date of the exam. You will replicate the main results of

    Natalia Nollenberger, Núria Rodríguez-Planas, and Almudena Sevilla. The math gender gap: The role of culture. *American Economic Review*, 106(5):257–61, May 2016.

    using Python or R. The second exam is cumulative, and may cover any of the material presented in the course.
  - **No makeup exams will be given except in the case of an emergency, documented with either a doctor's note or a letter from Queens College.**

- **Attendance and Absences**

  - Attendance is expected and will be taken each class.

- – Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee's responsibility to get all missing notes or materials.

- **Students with Disabilities**

  - – Students with disabilities who are enrolled in this course and who will be requesting documented disability-related accommodations are encouraged to make an appointment with the Office of Special Services for Students with Disabilities, (718-997-5870) during the first week of class.
  - – After approval for accommodations is granted, please submit your accommodations letter to me as soon as possible to ensure the successful implementation of those accommodations.

Policy on academic integrity:

Academic dishonesty is prohibited in the City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion. You are responsible for reviewing this policy as provided at: http://web.cuny.edu/academics/info-central/policies/academic-integrity.pdf. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member MUST report the violation.

Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments.

Topic	Chapters
1. Data types, data structures in Python and R	see supplementary readings
2. Control structures and custom functions in Python and R	see supplementary readings
3. Data frames and graphics in Python and R	see supplementary readings
4. Review: Regression Analysis, Statistical Properties of OLS	6–9
5. Regression Analysis with Panel Data	10
6. IV Estimation & 2SLS	12
7. Time Series Regression, Forecasting	14

Important Dates: 1/27 Semester starts; 2/12 Lincoln's birthday; 2/17 President's Day; 4/7 Wednesday schedule; 4/8–4/16 Spring Recess; 5/15 Reading Day; 5/16–5/22 Finals.