**Rutgers University**
**The State University of New Jersey**
**Department of Economics - CCAS**
**Spring 2017**

**Class Information**

**Course Title**: Econometrics (index#15578)
Economics 50:220:322

**Instructor:** Dr. I-Ming Chiu

**Office:** ARMITAGE 328
Phone (856) 225 6012

**E-mail address:** ichiu@camden.rutgers.edu

**Class Meeting:** BSB 336. 9:30-10:50 PM (Tuesday & Thursday)

**Office Hours:** 2:30-3:30 pm, Tuesday & Thursday or by appointment

**Course Description:** Econometrics is a branch of economics. It applies mathematical and statistical methods to explore and quantify the relationships between economic/financial variables. After a brief review on both mathematical and statistical fundamentals, linear regression model and its various alternatives will be introduced and explained. Students will be asked to conduct their own data analysis using econometric tools they learn from this course. The ultimate goal of this course is to equip students with analytical ability to *explain* and *forecast* economic, financial or social phenomena. With this quantitative skill in hand, students will be more competitive in the job market and succeed in their careers.

**Textbook (required)** Sanford Weisberg, Applied Linear Regression, 4th Edition, Wiley, 2014.

The above required textbook is available for purchase at the University District Bookstore (601 Cooper St., Camden, NJ 08102)

R. L. Thomas, Modern Econometrics: An Introduction, Longman U.K., 1997. (This second reading is not required, but some course material will be drawn from this book. It can be purchased at Amazon.com)

**Other References:** Michael W. Trosset, An Introduction to Statistical Inference and Its Applications with R, CRC Press, 2009.

David M Diez, Christopher D Barr, and Mine Çetinkaya-Rundel, OpenIntro Statistics, 3rd Edition, OpenIntro Inc., 2015. (The online edition is free for download at the following web site)

https://www.openintro.org/stat/textbook.php?stat_book=os

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Jay L Devore and Kenneth N. Berk, <u>Modern Mathematical Statistics with Applications</u>, 2nd Edition, Springer, 2012.

Kyle C. Longest, <u>Using Stata for Quantitative Analysis</u>, 2nd Edition, Sage, 2015.

**Computing:** All the computations will be done using statistical software **Stata** & **R**. The virtual implementation of Stata can be found at the following site: https://apps.camden.rutgers.edu/novnc/, where NetID login is required. The R software is free for download at http://www.r-project.org. There is an integrated development environment (IDE) for R called RStudio and is also free for download at https://www.rstudio.com/products/rstudio/download/

**Notice: you have to install R before installing RStudio**

**R Installation:** https://www.youtube.com/watch?v=Icawuhf0Yqo (for Mac)
https://www.youtube.com/watch?v=hxj0UG4boGU (for PC)

**Class Material:** Handouts, readings, data, and homework assignments will be posted on **Sakai** website.

**Online Learning:** https://www.datacamp.com/ (Learn Data Science online)

**Useful Websites:** http://www.ats.ucla.edu/stat/(Learning Stata and other softwares)

http://www.statmethods.net/ (Computing using R web site)

**Data Sources:** http://www.federalreserve.gov/econresdata/statisticsdata.htm (the Federal Reserve System)

http://finance.yahoo.com (Yahoo Finance Section)

http://www.bea.gov (Bureau of Economic Analysis)

**Spring '17 Calendar:** https://registrar.camden.rutgers.edu/academic-calendar-2016-2017

**Grading:** **Contribution to Final Grade**

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|---|---|
| - Attendance | 5% |
| - Take-home problems | 30% |
| - Midterm Exam (2) | 40% |
| - Final Exam | 25% |
| - Participation (extra credit) | 5% |

**Grading Policy:**   Term grades will be based on the final distribution of the above grading weights.

**Exam Preparation:**   The exam questions will be drawn from three sources: (i) homework assignments, (ii) course lectures, and (iii) reading material.

**Class Participation:**   Class attendance is essential for learning achievement. When missing a class, it would cost you more time to learn on your own. I strongly recommend the following steps for your successful learning: (1) attend every class and take notes; (2) review everything you learn from the class immediately, never put it off; (3) ask questions and participate in class discussions.

**Academic conduct:**   Make up exams will be given **only upon prior notice**. I request prior knowledge of any expected absence from an exam. If this is not feasible, you can document a valid reason for missing the exam. Unexcused absence on any exam will result in a grade of zero. Dishonesty in seeking an excused absence or in the examination process will result in a grade of zero on the exam involved and in university discipline.

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**Course Outline:**

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|---|---|
| Topic 1 | Data Exploration using R<br>Introduce: R, RStudio and Stata GUI |
| R lab | There are R lab sessions that accompanies each learning topic |
| Topic 2 | Probability Theory & Statistical Inference (Review) |
| Topic 3 | Linear Algebra, Matrix Operations and some Calculus |
| Topic 4 | Bivariate Distribution and Conditional Mean Function |
| 1st Midterm Exam | Date: TBA in class |
| Topic 5 | Simple Linear Regression Model (Introduce: Stata Do files) |
| Topic 6 | Multiple Linear Regression Model with Complex Regressors |
| Topic 7 | Shrinkage Methods: Ridge Regression and Lasso |
| Topic 8 | Box-Cox Transformations |
| 2nd Midterm Exam | Date: TBA in class |
| Topic 9 | Regression Diagnostics |
| Topic 10 | Binomial (Logit & Probit) and Poisson Regression Model |
| Final Exam (school schedule) | TBA by school |