

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

Class Information

Course Title: Financial Econometrics & Data Mining (index#20245)

Economics 366/Section 01

Instructor: Dr. I-Ming Chiu

Office: ARMITAGE 328

Phone (856) 225 6012

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

Class Meeting: BSB 335. 11:00 AM-12:20 PM (Tuesday & Thursday)

Office Hours: 3:30-4:30 pm, Tuesday & Thursday or by appointment

Course Description: The first part of the course introduces students to the exciting field of financial econometrics where statistical models are used to analyze, explain, and forecast financial instruments such as bonds and stocks. Once students have a better understanding on these financial econometric tools, the second part of the course introduces various learning methods that are commonly used in the financial and business environment. The topics include linear regression model, logistic regression model, KNN, Support Vector Machine, Naïve Bayes, and K-Means Clustering. Each topic covered is accompanied with a case study, so students will gain many hands-on learning experiences. The ultimate goal in this course is to equip students with modern financial analytical tools, which has a high demand in the job market.

Required Reading: Mark Bennett and Dirk Hugen, [Financial Analytics with R: Building a Laptop Laboratory for Data Science](#), Cambridge Univ. Press, 2016. (Electronic edition can be purchased at Amazon.com)

Jared P. Lander, [R for Everyone: Advanced Analytics and Graphics](#), Addison-Wesley Data and Analytics, 2013. (Electronic edition can be purchased at Amazon.com)

Both of the above required books are available for purchase at the University District Bookstore (601 Cooper St., Camden, NJ 08102)

Other References: Ruey S. Tsay, [An Introduction to Analysis of Financial Data with R](#), Wiley, 2013.

Walter Enders, [Applied Econometric Time Series](#), 4th edition, Wiley, 2015.

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Max Kuhn & Kjell Johnson, Applied Predictive Modeling, Springer, 2013.

Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani, An Introduction to Statistical Learning/with Applications in R, Springer, 2013.

Harry Georgakopoulos, Quantitative Trading with R: Understanding Mathematical and Computational Tools from a Quant's Perspective, Palgrave Macmillan, 2015.

Computing: All the computations will be done using an open source statistical software R. It can be downloaded at <http://www.r-project.org>. You're encouraged to download and use RStudio at the following site, which is an IDE (integrated development environment) for R. <https://www.rstudio.com/products/rstudio/>

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

Class Material: Data, handouts, assignments, and additional readings will be posted on Sakai website: <https://sakai.rutgers.edu/portal>.

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

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

Useful Websites: <http://www.statmethods.net/> (Computing using R web site)
<http://www.ats.ucla.edu/stat/> (Computing learning at UCLA)
<http://socserv.mcmaster.ca/jfox/> (Dr. Fox's statistics site)
<http://a-little-book-of-r-for-time-series.readthedocs.io/en/latest/> (R for Time Series Analysis)
<https://www.analyticsvidhya.com/> (Machine Learning)

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

Grading: **Contribution to Final Grade**

- Attendance 5%

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- Take-home problems	30%
- Midterm Exam (2)	40%
- Final Exam/Project	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:

	(A) FINANCIAL ECONOMETRICS
Topic 1	Financial Markets: Bonds & Stocks
Topic 2	Introduction to Computing Using R
Topic 3	Financial Statistics
Topic 4	Portfolio Theory
Exam 1	Date: TBA in class
Topic 5	Time Series: ARIMA Model
	(B) DATA MINING (Supervised Learning)
Topic 6	Linear Regression Models
Topic 7	Logistic Regression Model
Exam 2	Date: TBA in the class
Topic 8	K Nearest Neighbors (KNN) & Support Vector Machine
Topic 9	Naïve Bayes
	(C) DATA MINING (Unsupervised Learning)
Topic 10	K-Means Clustering
Final Exam (or Project)	TBA by school