Rutgers University
The State University of New Jersey
Department of Economics - CCAS
Fall 2015

Class Information

Course Title:	Business Cycles and Forecasting (index#18407)
	Economics 392/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:	3:00-4:00 PM, Thursday, or by appointment
Course Description:	The term "business cycles" is used to describe the fluctuations in the overall economic activities. This class will introduce various macroeconomic theories that help students better understand the aspects of business cycles. After a short review on main stream business cycles theories, students will be exposed to modern forecasting methodologies and some data mining tools. All the forecasting and data mining techniques will be learned and implemented via the powerful free statistical software R. The ultimate goal of this class is to equip students with data analytical ability and enable them to make better business/economic decisions.
Required Reading:	Spyros G. Makridakis, Steven C. Wheelwright, Rob J. Hyndman, Forecasting/Methods and Applications, 3rd Edition, Wiley, 1998. (Paperback edition can be purchased at Amazon.com and the ISBN is 978-8126518524)
	Galit Shmueli & Kenneth C. Lichtendahl, JR., Practical Time Series Forecasting with R: A Hands-On Guide, Axelrod Schnall, 2015. (Both Kindle and paperback edition can be purchased at Amazon.com)
	Robert I. Kabacoff, R in Action, 2nd Edition, Manning, 2015. (eBook is available at http://www.manning.com/kabacoff2/)
	All of the above three required books are also 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.

John E. Hanke & Dean W. Wichern, Business Forecasting, 9th edition, Pearson, 2009.

Vincent Su, Economic Fluctuations and Forecasting, HarperCollins College Publishers, 1996.

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: Handouts, readings, and homework assignments will be posted on Sakai website: https://sakai.rutgers.edu/portal.

Fall '15 Calendar: https://registrar.camden.rutgers.edu/sites/registrar/files/AcademicCalendar2015-16a.pdf

Useful Websites: http://robjhyndman.com/forecasting/ (Dr. Hyndman's textbook companion web site).

http://www.forecastingbook.com/news/nowavailablepracticaltimeseriesforecastingwithr (Dr. Shmueli's textbook companion web site).

http://www.statmethods.net/ (Dr. Kabacoff's web site).

http://www.ats.ucla.edu/stat/ (Computing learning at UCLA)

http://socserv.mcmaster.ca/jfox/ (Dr. Fox's statistics site)

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Grading:	**Contribution to Final Grade**	
	- Attendance	5%
	- Take-home problems	40%
	- Midterm Exam (2)	30%
	- 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:

Topic 1	Macroeconomic Theories: Classical vs. Keynesian
Topic 2	Data Exploration & Computing using R: An Introduction
Topic 3	Business Cycles
Topic 4	Learning Statistical Fundamentals using Simulation & Bootstrap Methods
Topic 5	Time Series Decomposition and Smoothing Methods
Exam 1	Date: TBA in the class
Topic 6	Linear Regression Model and Its Alternatives (I): Simple and Multiple Regression Models
Topic 7	Linear Regression Model and Its Alternatives (II): Probit/Logit, Poisson and Ridge Regression Models
Topic 8	The Box-Jenkins Methodology for ARIMA Models
Exam 2	Date: TBA in the class
Topic 9	Applications of ARIMA models in Finance (continue from Topic 8)
Topic 10	A Simple Introduction to Advanced Forecasting Models: Dynamic Regression, Intervention Analysis and State Space Models
Final Exam (school schedule)	**11:30 AM - 2:30 PM, Tuesday, December 15.**

Note: required reading abbreviation: MWH, SL and RK (three required reading appeared on pp. 1). The teaching material for Topic 2 and 4~10 will be based on the required reading. I will indicate the sources of reading in the beginning of each handout.