

Business Analytics & Information Technology
COURSE NUMBER: 33:136:485
COURSE TITLE: Time Series Modeling For Business**COURSE OBJECTIVES**

This course covers applied statistical methodologies pertaining to time series analysis, with an emphasis on model building and accurate prediction. Completion of this course will equip students with insights and modeling tools to analyze real world business time series. Students are expected to have basic working knowledge of probability and statistics including linear regression, estimation and testing from the applied perspective. We will use R throughout the course.

COURSE MATERIALS**Recommended textbook:**

Forecasting: principles and practice, by R. Hyndman and G. Athanasopoulos. Available on- line at <http://otexts.com/fpp/>

Introductory Time Series with R, by Paul S.P. Cowpertwait and Andrew V. Metcalfe. Lecture notes will also be provided.

Lecture notes, homework assignments, supplemental materials and announcements will be posted on blackboard.

LEARNING OUTCOMES

A student graduating this course will gain knowledge in the following topics:

- The ability to approach and analyze business time series.
 - The ability to differentiate between various time series models.
 - The ability to perform cross-validation of the model developed.
 - The ability to forecast future observations of the time series.
 - A running knowledge of R for applied time series analysis.
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EXAMS

There will be two exams. Both exams will be in-class and closed book. No makeup exam will be given in general.

HOMEWORK ASSIGNMENTS

Homework assignments will be given regularly. For large assignments you are expected to work in groups of 3-4 students. These assignments will be graded as a group and late home- work will NOT be accepted. Credit for homework is given based on HOW the problems are solved instead of a numerical answer.

QUIZZES

Quizzes will be given throughout the semester. No makeup is allowed.

ATTENDENCE

Attendance to each class meeting is required. Students are responsible for all announcements and supplements given within each lecture and/or via course email/blackboard.

GRADING

- Homeworks 30%,
 - Quizzes 10%,
 - Exam One 30%,
 - Exam Two 30%.
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TENTATIVE COURSE OUTLINE

Sep 4. Introduction to time series, review of basic statistics and R.
Sep 11. Basic analysis tools, simple regression.
Sep 18. Multiple regression for time series, time series decomposition.
Sep 25. Smoothing techniques.
Oct. 2. Basic stochastic models.
Oct. 9 Exam one; AR and MA models.
Oct. 16 ARMA models. PACF.
Oct. 23 ARIMA models.
Oct. 30 Seasonal ARIMA and dynamic regression.
Nov. 6 ARCH model.
Nov. 13 GARCH model.
Nov. 20 Exam two. Vector AR models
Nov. 25 Vector AR models and pairs trading
Dec. 4 Presentation.

ACADEMIC INTEGRITY AND HONOR CODE

I understand and will live up to the standards of academic integrity explained at <http://academicintegrity.rutgers.edu/integrity.shtml>. Rutgers University, in conjunction with RBS, has established an Honor Code that includes this pledge: I pledge, on my honor, that I have neither received nor given any unauthorized assistance on this examination (assignment).
