

## Statistics 435, Statistics 711

Spring 2007

### Instructor

Paul Shaman, 468 JMHH, shaman@wharton.upenn.edu, 215-898-8749

### Class Hours and Location

TuTh 3-4:20, G92 JMHH

### Office Hours

M 3-6, TuTh 4:30-6 and by appointment

### Teaching Assistant

Dongyu Lin, 427.1 JMHH, dongyu@wharton.upenn.edu, 215-898-6360

### Text and Materials

Class notes.

Tsay, R. S., *Analysis of Financial Time Series*, 2nd ed. Wiley, New York, 2005.

### Software

JMP IN 5.1 statistical software, SAS Institute, Inc., Cary, NC, 2000. I *highly recommend* you buy the software so that you have it on your own computer. We will use it extensively in class and you will need to know how to read its output and use it for assignments and for reading and interpreting class materials. When you install the software on your computer you will also have installed five manuals, all in pdf format.

JMP IN 5.1 is available at the bookstore. As an alternative, you may purchase JMP 6 at [www.e-academy.com](http://www.e-academy.com). A six-month license costs \$29.95 and a twelve-month license sells for \$49.95. For our purposes the differences between releases 5.1 and 6 are very minor.

JMP IN software is installed in the Wharton computer labs, all in Huntsman: F75 (60 seats), F80 (29 seats), 375 (80 seats) and 380 (80 seats).

## Course website

Statistics 435/711 is using webCafe. You can gain access by going to <http://webcafe.wharton.upenn.edu> and following the link to the Statistics Department. All materials for this course will be distributed and managed via the website.

**Note for non-Wharton students:** If you do not have a Wharton computing account, you will need to establish one to access the website. The account also provides access to the computing labs in Wharton and to the intranet. To get an account, go to

<http://accounts.wharton.upenn.edu>

After you have obtained your account, allow some time for activation.

Wharton students and students who have recently taken a Wharton course have existing accounts.

## Course Description

The aims of this course are to introduce basic time series and forecasting techniques. The emphasis will be upon the use of statistical methodology, and the written communication of statistical results. Considerable time will be devoted to understanding econometric and statistical problems in the contexts in which they arise, and to proper selection of statistical techniques and interpretation of the statistical output.

The primary class materials will be instructor's notes; the text will be supplementary. As noted above, JMP-IN software will be used extensively in classroom presentations and will be incorporated into the class notes. The software offers excellent graphics which will be useful for picturing data and illustrating methodology.

For methods not covered by JMP IN we will employ R, time permitting.

There will be about five homework assignments. Each homework will involve the analysis of a data set and interpretation of the findings, and presentation of a short report.

## Topics

The primary goal is to present time series techniques. Basic multiple regression will be reviewed at the beginning, and additional regression topics will be presented as they are needed. For the most part, because of time limitations, attention will be focussed on univariate series. Data sets studied will be business and economic time series, including financial market data.

Review of Multiple Regression

Decomposition Models

ARIMA Models

Spectral Methods

Exponential Smoothing

ARCH and GARCH Models

Nonlinear Models

Combination of Forecasts