California State University, Long Beach, Dept. of Math and Stat

MATH 582-01, Time Series Analysis
Fall 2006

Note: The last day to withdraw without the CNSM deans signature is Nov 17, 2006. Request for special need for accommodation of a University verified disability should be submitted within the first two weeks with all necessary documentation. If you received permission to register for a closed class section, only you can enroll for the course. It is the student's responsibility to complete the registration process before the dates indicated in the *Schedule of Classes*.

Instructor: Prof. Sung Kim, FO3 206, e-mail skim43@csulb.edu, phone 54320,
office hours MW 4:00-5:30.
Any office hour may be canceled due to illness or necessary appointments, and students should not therefore depend on the faculty being in his office for a particular office hour. Students thus should secure any necessay signatures or other requirments well in advance of any deadline.

Lecture: MW 5:30-6:45, LA5 263, course web **http://www.csulb.edu/~skim43/math582/math582.htm**

Goal: The students should become familiar with both time domain and frequency domain approaches of the Time Series Analysis. Lectures consist of the theoretical background of the statistical methodologies and practical examples. A powerful PC-based package 'Applied Statistical Time Series Analysis (ASTSA)' for window will be used during the course. You are required to download the package from the web, and install in your PC. No programming experience is required to use the package.

Textbooks: Required: Chatfield, C (2004). The Analysis of Time Series: An Introduction. 6th ed. Chapman & Hall/CRC (ISBN 1-58488-317-0)
Recommended: Shumway, R.H. and Stoffer, D. S. (2000). Time Series Analysis and Its Applications. New York: Springer
Brockwell and Davis (2002). Introduction to Time Series and Forecasting. 2nd edition. Springer

Homework assignments: Four homework will be assigned. The problem sets and due dates will be distributed during class. The problem sets involve both theoretical and practical parts.

Exams: We will have two in-class exams and one take-home final exam. Tentative schedule for the exams is TBA

Grading:

- 30% homework
- 20% midterm I (in-class)
- 20% midterm II(in-class)
- 30% take-home final

The distribution of the grades will follow a curve.

Outline

1. Univariate and Multivariage Time Series
   (a) Introduction
   (b) Time Series Relationships
2. Spectral Analysis
   (a) Cyclical behavior and periodicity
   (b) Discrete Fourier Trasformation, Periodogram, and Smoothed Spectrum
   (c) Coherence and Impulse Response Function
   (d) Linear Filtering
3. Univariate Time Series Models
   (a) Least Squares Univariate Regression
   (b) Autoregressive (AR) Models
   (c) Autoregressive Integrated Moving Average (ARIMA) Models
   (d) Seasonal ARIMA Models
   (e) Regression With Correlated Errors
4. Multivariate Time Series Models
   (a) Multivariate Regression
   (b) Vector Autoregressive (VAR) Models
   (c) Transfer Function Models
   (d) State Space Models and Kalman Filtering