

**STATISTICS 4540**  
**TIME SERIES II**

**List of Topics**

1. The nature of time series; stationary and nonstationary time series.
2. Time domain methods: autocorrelation and partial autocorrelation functions; ARMA models; invertibility; Box-Jenkins approach for identifying and estimating time series.
3. Frequency domain methods: Background on Fourier series; power spectrum, and its relationship to the autocorrelation function; spectral representation theorem.
4. Advanced topics: State-space models and KalmanFilter; analysis of bivariate series; Bayesian methods and dynamic models.

**Text:** *Time Series Analysis and its Applications* by Shumway and Stoffer.

<b>Marks:</b>	Assignments	25%
	Midterm Exam	30%
	Project	35%
	Presentation	10%

**Calendar Description:** **4540 Time Series II** examines the analysis of time series in the time domain and is an introduction to frequency domain analysis. Topics covered include integrated ARMA processes, seasonal time series models, intervention analysis and outlier detection, transfer function models, time series regression and GARCH models, vector time series models, state space models and the Kalman Filter. Spectral decomposition of a time series is introduced. Emphasis is on applications and examples with a statistical software package.

Prerequisites: Statistics 3411 and 3540.

**Offered:** *Contact the Deputy Head (Statistics) in the Department of Mathematics and Statistics for information regarding the scheduling of this course.*