



Statistics 505 **Time Series Analysis**

Trend fitting, auto-regressive schemes, moving average models, periodograms, second-order stationary processes, ARCH models, statistical software for time series. Additional topics may include Bayesian analysis, spectral theory, Kalman filtering.

Course Hours: H(3-1T)

Prerequisite(s): [Statistics 429](#) or consent of the Division.

Suggested Text: "Time Series Analysis", Box, 3rd Edition, Jenkins and Reinsel, "The Analysis of Time Series", 6th Edition. Chatfield.

Syllabus

<u>Topics</u>	<u>Hours</u>
<u>Multivariate Normal Distribution:</u> moment generating functions, covariances, independence, correlation	3
<u>Spectral Decomposition of Covariance:</u> Bochner's Theorem.	3
<u>Spectral Decomposition of Time Series:</u> Proof using Hilbert Spaces, properties of the spectral measure.	9
<u>Estimation of the Spectral Distribution:</u> Periodograms	3
<u>Moving Average processes:</u> Hilbert space proof that all time series can be represented as a moving average process.	3
<u>Linear Filters: Input output.</u> Computation of the spectral density of the output in terms of the spectral density of the input.	3
<u>AR(p), MA(q) and ARMA(p,q) Processes:</u>	9
<u>Prediction:</u>	3
	36
