Students requiring accommodations as a result of disability, must contact the Centre for Students with Disabilities 778-782-3112 or csdo@sfu.ca

Instructor: Dr Richard Lockhart

Textbook:

None.

Prerequisites:

STAT 450 or equivalent or permission of the instructor.

Calendar Description:

An introduction to time series models and their analysis. Both time-domain and frequency-domain techniques will be studied.

Course Outline:
This course is intended to survey both time-domain and frequency domain analysis of time series. I expect you all to be familiar with the basics of the multivariate normal distribution and complex arithmetic. I will develop Fourier methods briefly where necessary.

1. Stationary Processes: definitions, mean, auto covariance, autocorrelation.
2. Linear Processes: white noise, moving averages, auto regressions, ARMA processes, conditions for stationarity, identifiability, invertibility.
3. Model identification: properties of autocorrelation and partial auto correlation functions.
4. Integration: ARIMA processes, differencing, random walks.
5. Seasonal effects.
6. Estimation: maximum likelihood, conditional likelihood and approximations, backcasting.
7. Model diagnostics: residual plots, residual autocorrelation, portmanteau tests.
8. Forecasting: prediction intervals, forecast standard error.
9. Spectral analysis: Fourier expansions, Fourier series, power spectrum.
10. Estimation of power spectrum, smoothing, Gibbs' phenomenon, tapering, filters.

Grading Scheme:

Assignments – 60%