

(—; 3-0-0)

Discrete Time Series Analysis

STAT-464*

Many systems evolve with an inherent amount of randomness in time and/or space. The focus of this course is on developing and analysing methods for analyzing time series. Because most of the common time-domain methods are unreliable, the emphasis is on frequency-domain methods, *i.e.* methods that work and expose the bias that plagues most time-domain techniques. Slepian sequences (discrete prolate spheroidal sequences) and multi-taper methods of spectrum estimation are covered in detail.

Textbook: *Notes and selected reading*

Prerequisite: MATH-335* or 338* and MATH-251* or STAT-261* and MATH-312*.

Instructor: D. J. Thomson

Evaluation:	Final examination	20%
	Midterm test	40%
	Assignments	40%

Outline:

- Introduction to Time Series
- Review of Fourier Transforms and the FFT
- Prediction Problems and Harmonic Processes
- Stationary Processes and the Spectral Representation
- Classical Spectrum Estimates
- Multitaper Estimates
- Tests for Periodic Terms
- Bivariate Processes
- Nonstationary Processes and Additional Topics