Aim of the course
The course aims to provide learners with a toolkit for the understanding and application of a range of key methods in the field of time series. Fundamental ideas in both the time and frequency domain analysis of time series will be described.

Objectives
On completing the course, students should be able to demonstrate an understanding of the techniques and applications of well-known ideas in time series such as autocorrelation, stochastic models (including the ARIMA and GARCH families), popular forecasting methods and spectral analysis for univariate time series.

Teaching methods
In most lecture sessions, delivered live using zoom, an in-class activity followed by peer discussion (in breakout rooms) and canvas quiz questions will replace at least part of the lecture component. The in-class activities created for the course are useful tools to enhance student learning, and, as research shows, are far more effective than even the most polished traditional lectures on the same topics. Weekly labs are designed to provide students with additional insights into time series concepts introduced in class as well as to teach how to implement a time series analysis using open-source software R.
Prerequisites
One of MATH 302, MATH 318, STAT 302 and one of STAT 200, ECON 325.
Co-requisite: STAT 305

Textbook

Assessment
- Written assignments: 20% (4 × 5% each)
- On-line WeBWork homework: 10%
- Labs: 5%
- In-class work (canvas quizzed based on in-class activities): 5%
- Mid-term: 20%
- Final exam: 40%

The usual university rules for extenuating circumstances and plagiarism apply.

Tentative course topics
Chapter 1: Exploratory techniques in time series analysis
Chapter 2: Stochastic models for time series
Chapter 3: Estimation and model fitting for time series
Chapter 4: Prediction for time series
Chapter 5: An introduction to the frequency domain
Chapter 6: Inference in the frequency domain
Chapter 7: Models for changing variance: GARCH processes