

University of Toronto

TIME SERIES ANALYSIS STA457H1

COURSE OUTLINE (2018 Fall)

Instructor: Jen-Wen Lin, PhD, CFA

Office Hours/LOCATION: TBA

Class Time/Place: Tuesday 0600-0900 pm/ OI G162

Email: jenwen@utstat.toronto.edu

Teaching assistants: Guo, Zhaoyu (Kenny), kenny.guo@mail.utoronto.ca

COURSE DESCRIPTION

This course provides an introduction to time series analysis with applications in finance and investments. The techniques learned in this course can also be applied to other disciplines. After finishing this course, students are expected to gain hands-on knowledge on how to analyze and model time series data. Topics in this course include fundamental concepts of time series, Box-Jenkins methods (ARIMA models), multivariate time series analysis (transfer function model, Vector autoregression, co-integration), and applications of machine learning techniques in time series analysis, such as bagging and boosting for forecasting time series.

WEIGHTING SCHEME

The final mark will be calculated using the following formula

$$20\% \times \text{Assignment} + 80\% \times \text{Final exam (tentative)}$$

- Team assignment (two students)
- Late penalty (20% deduction per day after missing deadline)
- Please read and obey academic integrity at University of Toronto (www.artsci.utoronto.ca/osai/students)

TEXTBOOK (OPTIONAL)

Wei (2005), Time Series Analysis—Univariate and Multivariate Methods.
<https://search.library.utoronto.ca/details?5587975&uuid=be2c9580-3b87-4133-897a-04dac9884666>

Teaching assistants

1. Kenny Guo: kenny.guo@mail.utoronto.ca

Responsibility: assignment and final exam

2. Daodao Dong: daodao.dong@mail.utoronto.ca

Responsibility: midterm test and regular office hours

- *Time:* 10-12am on Wednesday and 1-3pm on Thursday (subject to change)
- *Location:* SS623B

My office hours

1. To be announced later (in two to three weeks)
2. For this week, my Office hour will be held at Gerstein library B173 from 9 to 10 am tomorrow (Wednesday)

Tentative Schedule

# of lecture	Date	Topic	Note
1	11-Sep	Fundamental concepts	
2	18-Sep	Fundamental concepts and ARMA model	
3	25-Sep	ARMA model	
4	02-Oct	ARIMA model and unit root test	
5	09-Oct	Transfer function noise model and intervention analysis	
6	16-Oct	Multivariate time series	
7	23-Oct	Multivariate time series	Assignment questions available before Oct-21
8	30-Oct	Bootstrapping and bagging time series	Assignment due on 29-Oct
9	06-Nov	Fall reading week	Last date to drop F course at Nov-5
10	13-Nov	Catch-up/Selective topics	
11	20-Nov	Midterm term test	
12	27-Nov	Selective topics	
13	04-Dec	Graduate student presentation	1) TA returns midterm papers; 2) Attendance for undergraduates is not mandatory

Topics in multivariate time series include Vector autoregression, Granger causality, and cointegration

*: Selective topics (if time allows)

MIDAS regression and nowcasting using Google trends*

Forecasting and boosting time series model*

Marking Scheme update (18 September 2018)

$0.3 \times \text{team assignment} + 0.3 \times \text{midterm} + 0.4 \times \text{Final}$

1. Number of students in the team assignment: 2
2. If students miss the midterm test, their weight on midterm will be added to their weights on Final, i.e. their final exam will account for 70% of their course mark.
3. Midterm test covers materials taught before Oct-30 (exclusively)
4. Midterm test will be held on Nov 20, 2018 (class time)