



Faculty of Arts and Science Course Syllabus
Department of Statistical Sciences
Time Series Analysis — STA457H1/STA2202H
Fall 2020

Instructor: Tharshanna Nadarajah
Email: tharshanna.nadarajah@utoronto.ca
Class Day/Time: Thursday 9-10AM EST
Office hours: Mon. and Tues. 9-10AM EST on Bb Collaborate

1 Course Content

All lecture slides, recordings and materials will be posted on the Quercus course page. Further, any important announcements will also be posted in Quercus. Please make sure to check it regularly so you don't miss anything.

- <https://q.utoronto.ca/courses/190743>

Course materials provided on Quercus are for the use of students currently enrolled in this course only. Sharing (e.g., posting, providing, selling) course materials with anyone outside of the course is considered unauthorized use.

Lectures:

- We will use a mix of synchronous learning and asynchronous learning.
- Lecture slides, along with pre-recorded voice overs, will be uploaded weekly.
- We will use the scheduled lecture times (Thursdays 9-10 am EST) for live question-answer(QA) sessions followed by a 30 minutes quiz.

2 Course Description

An overview of methods and problems in the analysis of time series data. Topics include: descriptive methods; filtering and smoothing time series; theory of stationary processes; identifica-

tion and estimation of time series models; forecasting; seasonal adjustment; spectral estimation; bivariate time series models.

Course Prerequisites

STA302H (or equivalent) is listed in the calendar as a prerequisite for STA457H1F.

Course Objectives/Learning Outcomes

By the end of this course, all students should have a solid understanding of methods and problems in analyzing time series data with a primary application in Economics, Business, Finance, Physical and Environmental Sciences. The course will cover theoretical and practical aspects of time series analysis, making extensive use of the R statistical software.

- Understand and reason with the basic time series concepts
- Interpret and compare different time series models
- Identify and model different types of time series data
- Perform time series modelling/forecasting and present the results
- Use R to construct time series models and conduct analysis

3 Course Materials

Textbook:

Time Series Analysis and Its Applications

With R Examples, 4th Edition

by Robert H. Shumway & David S. Stoffer.

ISBN 978-3-319-52451-1

ISBN 978-3-319-52452-8 (eBook)

Statistical Software:

We will be using RStudio for performing statistical analyses. R is a free software that can either be downloaded onto your personal computer or used in the cloud. If you choose to work with R on your personal computer, then installation will be a two step process:

- The base R framework is available for download at <http://cran.r-project.org> for Windows, Mac and Linux operating systems.
- Next, RStudio is a good integrated development environment to R (makes it simpler to work in R) and can also be downloaded for free at <https://www.rstudio.com/products/rstudio/download>.

4 Course Assessment

Component	Weight	Date
Discussion Board Participation	5%	
Quizzes	20%	9 quizzes, approximately weekly
Assignments	20%	9 assignments, approximately weekly
Test 1	15%	Oct 8th at 9.00 am
Test 2	15%	Nov. 19th at 9.00 am
Final Project	25%	TBA

Discussion Board Participation Marks:

Participation will be assessed through Quercus Online Discussion Forums. In each discussion forum, you are expected to post a question from the associated lesson, and to reply to questions/responses of one your classmates. In general, marks will only be awarded for posts on course content. Your final participation mark will be calculated as follows:

Points	No of posts
0%	no posts
1%	4 posts
2%	8 posts
3%	12 posts
4%	16 posts
5%	20 posts

Weekly Quizzes:

There will be 9 “weekly” quizzes, that will be occurring during the last 30 minutes of the lecture time Thursdays. Quizzes will begin on Thursday Sept. 17 and continue until the last lecture period.

- We will take the best 8 quiz marks and drop the worst quiz in the calculation of your overall quiz mark
- Missed quiz: Because only the best 8 quiz marks will be counted, we will not be making any accommodations for missed quizzes. These will receive a mark of 0, but will be dropped as part of the worst quiz marks. Therefore, you may miss one quiz without penalty.
- There are no make-up quizzes. Quizzes, beyond the one that will be dropped, will be given zero.
- There will also be 9 Assignments on Quercus course page that will collectively contribute 20% to your mark. There are 9 assignments overall; there are no make-up assignment, but only the best 8 of 9 assignments will count toward your mark.

- Assignments and quizzes can be found under Quercus Assignments in the navigation bar, or through the link provided in that week’s module, and will only be available during the designated time. Assignments and quizzes must be done individually.
- “Weekly” assignments will be posted on Thursdays and the due will be on Wednesdays at 5.00pm EST, based on the previous week materials.

5 Course Policies

1. We will be using the Quercus Discussion Board as an online discussion forum. All questions about course material should be posted here or asked during TA/instructor office hours. The instructor and TAs will monitor the board and will help answer questions but students are encouraged to answer posts and help their fellow classmates.
2. Instructors and TAs will hold office hours through Bb Collaborate in the Quercus course page. The office hour schedule will be posted on Quercus. It is recommended that you visit office hours whenever you have a question about the material. It is more important than ever in an online accelerated class to have material clarified as quickly as possible. Please post your questions at least three hours before the due date. Don’t wait until the last minute to ask your questions!
3. E-mail should only be used for emergencies or personal matters. Please do not email your instructor asking questions like “how to do problem 2 in assignment 1?”, “when is the Test 1?”, “how to submit the assignment?”. Emails with questions like these will be ignored. Otherwise, students should expect a reply within 24 hours. Questions like these should be posted on the Quercus discussion board.
4. Make sure that you upload all of your assignment/quiz/test work on Quercus course page.
5. There will be no make-up assignments/quizzes/tests. If you miss a assignment/Quiz/test due to illness, accident, or family affliction, you should notify me as soon as possible, and provide a written request to be excused as well as supporting documentation. If you miss a assignment/quiz/tests and the absence is not excused, zero marks will be awarded.

6 Academic Integrity

Academic integrity Academic integrity is fundamental to learning and scholarship at the University of Toronto. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the University of Toronto degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves. Familiarize yourself with the University of Toronto’s Code of Behaviour on Academic Matters available at <https://www.academicintegrity.utoronto.ca/perils-and-pitfalls>

Students are not allowed to share quiz or test questions with anyone (not even with other students taking this course). Sharing questions and submitting works completed by someone else is a huge academic offence. Please stay away from this type of behaviors.

7 Schedule:

Week	Assessment	Due Dates
Sept. 10-16	No Quiz Assignment 1	Sept. 16th at 5:00pm EST
Sept. 17-23	Class Quiz 1 Assignment 2	Sept. 17th at 9.00 am EST Sept. 23rd at 5:00pm EST
Sept. 24-30	Class Quiz 2 Assignment 3	Sept. 24th at 9.00 am EST Sept. 30th at 5:00pm EST
Oct. 1-7	Class Quiz 3 Assignment 4	Oct. 1st at 9.00 am EST Oct. 7th at 5:00pm EST
Oct. 8-14	Test 1	Oct. 8th at 5:00pm EST
Oct. 15-21	Class Quiz 4 Assignment 5	Oct. 15th at 9.00 am EST Oct. 21st at 5:00pm EST
Oct. 22-28	Class Quiz 5 Assignment 6	Oct. 22nd at 9.00 am EST Oct. 28th at 5:00pm EST
Oct. 29-Nov. 4	Class Quiz 6 Assignment 7	Oct. 2th9 at 9.00 am EST Nov. 4th at 5:00pm EST
Nov. 5-6	Class Quiz 7 No Assignment	Nov. 5th at 9.00 am EST
Nov. 9-13	Fall Reading Week	No classes
Nov. 16-20	Test 2	Nov. 19th at 9:00am EST
Nov. 23-27	Class Quiz 8 Assignment 8	Nov. 26th at 9.00 am EST Nov. 25th at 5:00pm EST
Nov. 30-Dec 4	Class Quiz 9 Assignment 9	Dec. 3rd at 9.00 am EST Dec. 2nd at 5:00pm EST
Dec 7-9	No Class Quiz No Assignment	

All information in the course outline are approximate and subject to change. All the announcements about the changes will be made via Quercus which students are expected to check regularly.