The University of Iowa
The College of Liberal Arts and Sciences
Fall, 2023

Title of course: STAT:7560:0001 Time Series Analysis

Course meeting time and place: 1:30 - 2:20 PM MWF in 3 SH

 Department of Statistics & Actuarial Science

Instructor: Prof. Osnat Stramer, 370 SH, Phone 335-3182, Email osnat-stramer@uiowa.edu

Student drop-in hours: MW 12:00 PM-1:00 PM, and F 12:30 PM-1:00 PM in 370 SH. Students are invited to drop by during these hours to discuss questions about the course material or concerns. I am also available by appointment if you are unable to attend my drop-in hours.

Attendance: Attendance at lectures is expected and highly recommended. Failure to attend class regularly will affect your grade. You are responsible for all we do in class. Lectures are not recorded or broadcast via Zoom.

Departmental Executive Officer: Professor Kung-Sik Chan, 241 SH, Phone 335-0712, E-mail kung-sik-chan@uiowa.edu

Course Prerequisite: STAT:4101 (Mathematical Statistics II) **and** (STAT:3200 (Applied Linear Regression) **or** STAT:6560 (Applied Time Series Analysis)). Please make sure you completed the course prerequisite. It is required!

 References: The material for this class come from several different places, in particular:

1. E-Book: Time Series Analysis and Its Applications With R Examples by Robert H. Shumway, David S. Stoffer. SpringerLink (Online service) 4th ed. 2017.

2. E-book: Introduction to Time Series and Forecasting by Peter J. Brockwell, Richard A. Davis. SpringerLink (Online service) 3rd ed. 2016.

3. E-book: Time Series Analysis with Applications in R by Jonathan Cryer and Kung-Sik Chan. SpringerLink (Online service) 2nd ed. 2008.

4. Time Series Data Analysis and Theory, By Brillinger (1975).

5. You are encouraged to use R (see David Stoffer's tutorial).

Topics to Be Covered: Topics will be selected from stationary processes, time series regression and EDA, ARMA models, ARIMA models, long memory ARMA models, GARCH models, threshold models, multivariate ARMA models, and state space models.

Course Website: I will post announcements, homework problems, and other course information on ICON.

Homework: Several homework assignments consisting of a mix of data analysis and theoretical problems will be given. Some problems will cover material not addressed in class and may require additional reading. Suggested reading will also be posted on icon, but you should also seek out and explore relevant references on your own. Assignments will need to be submitted electronically. These assignments may take a long time to complete, so plan your time accordingly. Unless prior arrangements are made, late homework will not be accepted.

Project: Each student has to do a project and present the analysis on the date of the final exam. The project should represent new work, not something you have done for another course or as part of your thesis. The final written report should be typed and include your goals for this project, body of technical analyses with interpretations, a conclusion, and the listing of the data. Do not take old data sets from textbook or repositories of data sets that come from textbooks and other sources. You need to find a data set that is "fresher" and up to date. Including graphics, the report ordinarily should not exceed 15 pages in length. The final report on your project is due on Friday, December 8, and must be submitted electronically.

A proposal for your project is due on Wednesday, November 15, and must be submitted electronically. The proposal should be at most two pages long, outlining the scientific questions to be addressed and the relevant techniques to be employed, with a separate listing of the data.

More details concerning the project will be provided later in the semester.

Midterm exams: We will have two midterm exams in class. The tentative exam dates and times are exam 1 on Friday September 22, and exam 2 on Friday November 3.

Grading: The course grade will be based on assignments (30%), midterm 1 (10%), midterm 2 (15%), class project (40%), and attendance (5%). You may discuss general issues and approaches with your fellow students, but your work must be your own. If you use any references, including solutions to similar problems prepared by other students, you must cite and credit your sources. Scale runs like the following (and I may adjust it-curve it up if needed): A (90-100), B (75-89), C (55-74), D (40-54). A plus-minus grading system will be used.

Academic Honesty and Misconduct: All students in CLAS courses are expected to abide by the CLAS Code of Academic Honesty.

Student Complaints: Students with a complaint about a grade or a related matter should first discuss the situation with the instructor, and finally with the Director or Chair of the school, department, or program offering the course.

Undergraduate students should contact CLAS Undergraduate Programs for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS Associate Dean for Graduate Education and Outreach and Engagement when additional support is needed.

Drop Deadline for this Course: You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a "W" will appear on your transcript. The mark of "W" is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the Registrar's website. Undergraduate students can find policies on dropping and withdrawing here. Graduate students should adhere to the academic deadlines and policies set by the Graduate College.

University Policies:
Accommodations for Students with Disabilities
Basic Needs and Support for Students
Classroom Expectations
Exam Make-up Owing to Absence
Free Speech and Expression
Mental Health
Military Service Obligations
Non-discrimination
Religious Holy Days
Sexual Harassment/Misconduct and Supportive Measures
Sharing of Class Recordings