STA 421 Time Series Econometrics

Winter 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course introduces students to the principles and techniques of discrete time series analysis, a critical tool in various fields, including statistics, economics, engineering, and environmental science.Students will learn the foundational concepts, techniques, and tools needed to analyze and model discrete time series data effectively. The course will cover a range of topics, including statistical analysis, modeling, forecasting, and time series decomposition.

Upon Completion of this Course, students will be able to:

1. Gain a deep understanding of discrete time series data and their characteristics;

2. Learn to visualize and summarize time series data using appropriate graphical and statistical tools;

3. Develop proficiency in modeling time series data and identifying underlying patterns;

4. Apply time series analysis techniques to real-world datasets and research problems;

5. Use statistical software for time series modeling and analysis.

PREREQUISITES

ECO 317 Introduction to Econometrics

GRADING

Grades will be determined by accumulating points, with 100 points being the

maximum, as follows:

ITEM	POINTS
Assignments	30 Points
Midterm 1	15 Points
Midterm 2	15 Points
Exercises	20 Points
Final Exam	20 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

A $\geq$ 90 > B $\geq$ 80 > C $\geq$ 70 > D $\geq$ 60 > F.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

George E. P. Box, *Time Series Analysis: Forecasting and Control*, 5th Edition, Wiley-Blackwell, 2015.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Forecasting Time Series Topic 2: Estimation of Transfer Functions Topic 3: Discrete Control Systems Topic 4: Transfer Function Models **Assessments:** Assignment#1

Module 2	**Topics:** Topic 5: Autocorrelation Function And Spectrum Of Stationary Processes Topic 6: Time Series and Stochastic Processes Topic 7: Autocovariance and Autocorrelation Coefficients Topic 8: Positive Definiteness and the Autocovariance Matrix **Assessments:** Assignment#2 Exercise#1
Module 3	**Topics:** Topic 9: Autocovariance and Autocorrelation Functions Topic 10: Standard Errors of Autocorrelation Estimates Topic 11: Stationarity and Invertibility Conditions for a Linear Process Topic 12: Stationarity Conditions for Autoregressive Processes **Assessments:** Midterm#1 Exercise#2
Module 4	**Topics:** Topic 13: General Model for a Nonstationary Process Exhibiting Homogeneity Topic 14: Two Interpretations of the ARIMA Model Topic 15: Model Identification Topic 16: Identification Techniques **Assessments:** Assignment#3 Midterm#2
Module 5	**Topics:** Topic 17: Forecasting Topic 18: Spectral Properties Of Stationary Models Topic 19: Structural Component Time Series Models Topic 20: Additional Topics And Extensions **Assessments:** Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning

and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.

2) Assignments submitted in the wrong format will be counted as not submitted.

3) Failure to submit or fulfill any required course component results in failure of the class.

4) Make-up for midterm and final exams only with valid excuses, as defined by the University.

5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.