ECO 420 Applied Time Series Analysis

Winter 2024

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

COURSE OBJECTIVES

The objective of the course is to introduce you to time series analysis and forecasting. The orientation of the course is theoretical and applied. Students will learn various time series models and how they are applied to econometric techniques for estimation and forecasting. The topics include, among others, univariate autoregressive moving average (ARMA) processes, non-stationary and trend analysis. Each topic will be discussed with their macroeconomic, financial, and business applications.

Upon completion of this course, students will be able to:

1. Define time series data in an appropriate statistical framework;
2. Summarize and carry out exploratory and descriptive analysis of time series data;
3. Describe and conduct appropriate statistical modeling techniques and diagnostics for time series data;
4. Use R competently to model and produce point and interval forecasts and interpret the results for time series data.

PREREQUISITES

ECO 317 Introductory Econometrics

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
2 Assignments	20 Points
2 Quizzes	20 Points
Midterm Exam	25 Points
Final Exam	35 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:

"Time Series Analysis with Applications in R" By Jonathan Cryer and Kung-Sik Chan. 2nd edition (October 17, 2008), published by Springer Verlag.

Recommended (Optional) Texts or Other Materials:

None.

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Fundamental Concepts of Stochastic Processes Topic 2: Means, Variances, and Covariances Topic 3: Autocovariance and Autocorrelation Functions Topic 4: Stationarity Assessments: Assignment #1
Module 2	Topics: Topic 5: Models For Stationary Time Series and Nonstationary Time Series Topic 6: Moving Average Processes Topic 7: Autoregressive Processes Topic 8: ARIMA Models Assessments:

	Quiz #1
Module 3	Topics: Topic 9: Specification of Some Simulated Time Series Topic 10: Least Squares Estimation Topic 11: Properties of the Estimates Topic 12: Model diagnostics and model selection Assessments: Midterm Exam
Module 4	Topics: Topic 13: Minimum Mean Square Error Forecasting Topic 14: Deterministic Trends Topic 15: Forecasting Illustrations Topic 16: Forecasting Transformed Series. Assessments: Assignment #2
Module 5	Topics: Topic 17: Seasonal ARIMA Models Topic 18: Model Specification, Fitting, and Checking Topic 19: Forecasting Seasonal Models Topic 20: Time Series Regression Models Assessments: Quiz #2
Module 6	Topics: Topic 21: Time Series Models Of Heteroscedasticity Topic 22: Introduction To Spectral Analysis Topic 23: Estimating The Spectrum Topic 24: Final Exam Review 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.