



MAT 479 Introduction to Time Series Analysis

Winter 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email:TBA

COURSE OBJECTIVES

This course provides a comprehensive survey of time series analysis methods. Students will gain a deep understanding of various modeling techniques for stationary and nonstationary time series. The course will cover essential topics such as ARIMA specification, parameter estimation, model diagnostics, forecasting, and seasonal models. Additionally, advanced topics including GARCH, VAR, and other time series methodologies in econometrics and finance will be explored. Through theoretical discussions and practical applications, students will develop the skills necessary to analyze and interpret time series data effectively.

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

1. Test hypotheses about cointegration relationships in a system and how to determine empirically the number of such relationships
2. Estimate and do inference in cointegrated VAR' s
3. Work with model specification and they should have a practical knowledge of the different methods and techniques for model evaluation
4. Apply dynamic econometric model, for policy modeling and for forecasting
5. Apply time series methodologies in econometrics and finance contexts.

PREREQUISITES

MAT 381 Regression Analysis

GRADING

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



maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Midterm 1	20 Points
Midterm 2	20 Points
Final Exam	40 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:

Brockwell, P. J., & Davis, R. A. (2016). *Introduction to Time Series and Forecasting* (3rd ed.). Springer.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	<p>Topics: Topic 1: Components of a Time Series Topic 2: Stationarity and Nonstationarity Topic 3: Autocorrelation and Autocovariance Functions Topic 4: Time Series Visualization and Exploratory Data Analysis</p> <p>Assessments: Quiz#1</p>



Module 2	<p>Topics: Topic 5: ARIMA Models Topic 6: ARIMA Model Specification and Order Selection Topic 7: Parameter Estimation and Model Fitting Topic 8: Forecasting: Exponential Smoothing, Forecasting from ARIMA Models</p> <p>Assessments: Quiz#2</p>
Module 3	<p>Topics: Topic 9: Model Diagnostics and Residual Analysis Topic 10: Seasonal Time Series Analysis Topic 11: Seasonal decomposition techniques Topic 12: Seasonal ARIMA Models (SARIMA)</p> <p>Assessments: Midterm#1</p>
Module 4	<p>Topics: Topic 13: Model Estimation, Diagnostics, and Forecasting for Seasonal Data Topic 14: ARCH and GARCH models Topic 15: Vector Autoregressive (VAR) Models Topic 16: Cointegration and error Correction Models</p> <p>Assessments: Midterm#2</p>
Module 5	<p>Topics: Topic 17: State Space Models Topic 18: The Kalman Filter Topic 19: Time Varying Parameter Models Topic 20: Real Time Forecasts</p> <p>Assessments: Final Exam</p>

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).

ACADEMIC 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



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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.