



## ISOM4540 Time Series Analysis and Forecasting (L1) Spring Semester 2026

### Course Outline

---

Instructor	Dr. Jason MW HO Senior Lecturer Department of Information Systems, Business Statistics, and Operations Management (ISOM)
Office Location	LSK 6048A
Office Hours	Friday, 1230 – 1430
Email	<a href="mailto:imjasonho@ust.hk">imjasonho@ust.hk</a>

---

Teaching Assistant (TA)	Mr. Zhen GUO
Email	<a href="mailto:zguobr@connect.ust.hk">zguobr@connect.ust.hk</a>

---

### Class Schedule and Location

<b>L1</b>	1500 – 1620 (Wed & Fri)	4 February – 8 May 2026 (except 18 February, 3 April, 8 April and 1 May)	CYT G009B
<b>T1</b>	1700 – 1750 (Tue)	24 February – 5 May 2026 (except 7 April)	LSK G021

### Course Description

Statistics play an important role in every discipline that utilizes data. The diverse areas involving application of Statistics include Science, Medicine, Engineering, Business, among others. Rather than cross-sectional data, we often encounter time series data collected repeatedly across a period of time, for example, daily returns of a stock in the last 2 years and monthly sales of some commodities in a 10-year period. Studying such data helps us address questions like future prospect of an investment in a stock and prediction of production target that will meet the future demand in the business world. This course is designed to equip students with various statistical methods and forecasting techniques tailor-made for handling time series data, in place of standard statistical techniques built upon certain independence assumptions in the data structure.

## Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

- ILO1: Master basic theoretical concepts and common statistical methods for analyzing time series data, understand advantages and limitations of these time series methods, and decide which methods are most appropriate to use in a given situation.
- ILO2: Interpret and present statistical results of time series analyses that are either self-produced or provided by others.
- ILO3: Analyze real time series data using R in implementing common methods in time series analyses and forecasting.

## Assessment and Grading

This course will be assessed using criterion-referencing, and grades will not be assigned using a curve.

*Assessments:*

Assessment Task	Contribution to Overall Course Grade (%)	Due Date
In-class participation	5	Week 1 to 13
Homework assignment	20	Week 7, Week 9, and Week 13
Midterm examination	20	1 April 2026
Final examination	55	Spring term examination period; exact date to be announced by AR

*Mapping of Course ILOs to Assessment Tasks:*

Assessment Task	Mapped ILOs	Explanation
In-class participation	ILO1	This task emphasizes on and assesses students' understanding of the basic concepts in time series analysis and forecasting.
Homework assignment	ILO1, ILO2, ILO3	Homework allows students to solve a real problem in business environment, involving formulation of the problem in statistical terms, selection of an appropriate time series method to apply in a given situation upon analyzing any time series data, and interpretation and presentation of results from time series analysis of the data.
Midterm examination	ILO1, ILO2, ILO3	Midterm examination evaluates students' ability in mastering basic concepts and theory in time series analysis and forecasting, and interpreting correctly results from time series analyses.
Final examination	ILO1, ILO2, ILO3	Final examination evaluates students' ability in mastering basic concepts and theory in time series analysis and forecasting, and interpreting correctly results from time series analyses.

*More information about Assessment Tasks:*

Assessment Task	More Information
In-class participation	<ul style="list-style-type: none"> <li>Your participation will be assessed according to contributions to in-class discussion and learning via answering some simple questions</li> </ul>
Homework assignment	<ul style="list-style-type: none"> <li>3 sets of homework assignments</li> <li>All use of generative AI is restricted.</li> <li>Students should form groups of 3 students and contribute equally to completion of the assignments.</li> <li>Students can report any free-riding or irresponsible behavior of group members to TA via email <b>with sufficient supporting evidence</b>. Once verified, <b>students with such behavior will receive a lower individual mark</b>.</li> <li><b>Group formation on Canvas</b> should be completed by end of <b>Feb 15</b>.</li> </ul>
Midterm examination	<ul style="list-style-type: none"> <li>Closed book</li> <li>Help sheet (1 piece of A4-size paper with any content on all pages) allowed</li> <li>Scheduled on <b>1 April 2026 (in-lecture, or 6-9pm)</b></li> <li><b>Absence policy:</b> <ul style="list-style-type: none"> <li>Students must (i) obtain prior approval from the course instructor by providing a legitimate reason with relevant supporting documents, or (ii) submit a valid medical certificate justifying their absence to the course instructor within 3 days of the examination date.</li> <li>Students who meet the above condition (i) or (ii) will NOT attend any make-up examination. They MUST attend the final examination so that their final examination score will make up the missing 20% in their overall course grade.</li> </ul> </li> </ul>
Final examination	<ul style="list-style-type: none"> <li>Closed book</li> <li>Help sheet (2 pieces of A4-size paper with any content on all pages) allowed</li> <li><b>Date and venue to be announced</b></li> <li><b>Absence policy:</b> <ul style="list-style-type: none"> <li>Students must fill in and submit a specific form to report their case, providing appropriate documents, to the Academic Registry (AR) within 1 week of the scheduled exam date. Refer to the following webpage for more information - <a href="https://registry.hkust.edu.hk/resource-library/extenuating-circumstances-affecting-assessment">https://registry.hkust.edu.hk/resource-library/extenuating-circumstances-affecting-assessment</a>. Upon approval by AR, a make-up examination without marks deduction will be available.</li> <li>Students must sit for the final examination to pass the course. A student who misses the final examination will be automatically assigned an F grade.</li> </ul> </li> </ul>

*Final Grade Descriptors:*

Grade	Short Description	Explanation
A	Excellent Performance	Demonstrates a comprehensive grasp and understanding of fundamental statistical concepts, of selection and application of appropriate techniques and methods in analyzing time series

		data, and of interpretation and presentation of results from time series analyses
B	Good Performance	Demonstrates a high level of understanding of fundamental statistical concepts, of selection and application of appropriate techniques and methods in analyzing time series data, and of interpretation and presentation of results from time series analyses
C	Satisfactory Performance	Demonstrates adequate knowledge of fundamental statistical concepts, of selection and application of appropriate techniques and methods in analyzing time series data, and of interpretation and presentation of results from time series analyses
D	Marginal Pass	Demonstrates little or inconsistent knowledge of fundamental statistical concepts, of selection and application of appropriate techniques and methods in analyzing time series data, and of interpretation and presentation of results from time series analyses
F	Fail	Demonstrates a lack of understanding of fundamental statistical concepts, insufficient knowledge in selection and application of appropriate techniques and methods in analyzing time series data, and poor skills in interpretation and presentation of results from time series analyses

## Communication and Feedback

- Channel your enquiries regarding
  - administration and logistics of the course (e.g., missing lectures, issues about in-class participation, submission and grading of homework assignments, absence in exams, free-riding issue, etc.) to TA.
  - teaching and learning materials discussed in lectures to course instructor.
- Marks and feedback for individual assessed tasks will be communicated via Canvas within two weeks of submission.
- Any discrepancies in assessment marks posted in gradebook of Canvas should be reported to TA without any delay.

## Late submission Policy

To ensure fairness to students who submit homework assignments on time according to records on Canvas, a penalty (with no exception due to whatsoever reason) for late submission is listed as follows:

- Late submission within 6 hours: 25% penalty will be applied.
- Late submission between 6 to 24 hours: 50% penalty will be applied.
- Late submission for more than 24 hours will not be accepted.

## Course Materials

- Class slides, and other teaching materials available on Canvas in HKUST iLearn (<https://ilearn.ust.hk/iLearn/home.html>), or HKUST iLearn App on App Store or Google Play
- Reference Textbooks:

- *Forecasting: Principles and Practice* (2<sup>nd</sup> ed), Rob J Hyndman and George Athanasopoulos, OTexts (2018). Access the online textbook: <https://otexts.com/fpp2/>
- *Introductory Time Series with R (Use R!)*, Paul S.P. Cowpertwait and Andrew V. Metcalfe, Springer (2009).
- *Time Series Analysis and Its Applications (With R Examples)*, Robert H. Shumway and David S. Stoffer, Springer (2017).
- Required software: R
- R markdown files discussing R commands and R outputs of analyses in class slides

## Course AI Policy

**Restrict all use of generative AI for assessment:** You are prohibited from using generative artificial intelligence (AI) to produce any materials or content related to all take-home assessments, such as homework assignments.

## Academic Integrity

Students are expected to strictly adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST - Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

## Course Plan (subject to changes)

Module/Activity	Date
Module 1. Introduction	Feb 4
Module 2. Time Series Features	Feb 6, 11, 13
Module 3. The Forecaster's Toolbox	Feb 20, 25
Module 4. Time Series Decomposition	Feb 27
Module 5. Time Series Regression Models	Mar 4, 6, 11, 13, 18
Module 6. Exponential Smoothing	Mar 20, 25, 27
<b>Midterm Examination (up to Module 5)</b>	<b>Apr 1</b>
Module 7. ARMA Models	Apr 10, 15, 17, 22
Module 8. ARIMA Models	Apr 24, 29; May 6, 8