

# Final Exam: Information

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- ❖ **Time:** 2:30pm – 4:30pm on May 16, 2025 (Friday)
  - ❖ **Venue:** KKL610 (Computer lab)
  - ❖ **Format:** Computer-based, open-book exam
1. Excel file for the final exam will be posted on Moodle under “Final Exam” 2 minutes before the exam starts.
  2. A hard copy of exam paper with questions and instructions will be provided. You should answer all the questions in Excel and submit the file on Moodle.
  3. You must stop working at 4:30pm, and submit the Excel file before 4:35pm. No late submission will be accepted.
  4. You must complete the exam using the PC (Windows system) in the computer lab. Other electronic devices (such as laptop, cell phone, pad, calculator) are prohibited.



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## ❖ Format:

5. During the exam, you can get access to internet, reference books and teaching materials. You can directly use the VBA codes given in the course.
6. There are 3 questions in the final exam. Each question have several parts. 40-50% of total score from Excel questions, 50-60% from VBA code.
7. Grading criteria:
  - (1) Excel formulas: can correctly return values. If the formula is required to autofill to a range, you must design it for this purpose.
  - (2) VBA codes: satisfy all the requirements and generate correct actions (Sub) or values (Function).
  - (3) I give credit to each step of calculation in Excel, and partial credit to VBA code.



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8. Some tips to prevent slow Excel and computer crash:
  - (1) Don't open many Excel files at the same time, especially the workbook with simulations.
  - (2) If you write a wrong Function procedure in VBA, there is a chance to result in Excel crash. If your Function procedure cannot work and cause any issue in Excel, change the code to “comments” and write down a message (a comment) in VBA to remind me to check the code in comments. I will still give partial credit.
  - (3) **Save your Excel file frequently.**
  - (4) The file must be saved with “.xlsm” extension.



# Final Exam: Coverage

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- ❖ All the teaching materials, including handouts, slides, Excel files, assignments that have been discussed in class are required. Exceptions will be listed below.
- ❖ Financial models are given in the exam paper.
- ❖ Math proofs of the models will not be required. You should focus on how to use Excel spreadsheet and VBA codes to solve the models.

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❖ In the exam, **you do NOT need to download data**. All the data will be provided in Excel. Data source, sample period and frequency will be described in the exam paper. You need to know how to use them.

- Stock and option data: Yahoo Finance

- Interest rate:

- (1) US market: <https://fred.stlouisfed.org/> (Pay attention that the “frequency” means how frequent the interest rate data are updated. The data are always APR.)

- (2) US market: “RF” data is provided together with pricing factors on [Kenneth French’s website](#). (Monthly “RF” is the interest rate at the beginning of the month. The data frequency is already transformed to monthly interest rate in percentage.)

- (3) HK market: Overnight HIBOR rate on [HKMA website](#). The data are APR.

- Pricing factor data from [Kenneth French’s website](#).

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- ❖ Here are files in the course Moodle that you should review:
  - Topic 1: VBA programming
    - You should be familiar with the basics of VBA programming language.
    - Review the VBA codes we discussed in class and assignments.
    - You need to know how to record a macro, run your recorded macro, and do simple modifications (Example: Q1 in HW1).
    - Recording and modifying the macro for charts is NOT required.

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- Topic 2: Stock simulation based on GBM
  - We applied GBM model in the simulation of stock price, portfolio value, delta hedging strategy, and option value (past year exam question).
  - You should know how to conduct simulations in spreadsheet and VBA.
  - You must know how to do Monte Carlo simulation based on a given financial model. If you are asked to conduct simulation based on a model other than GBM and factor model, the theoretical model will be introduced in the exam paper.
  - VBA function for **Cholesky** decomposition will be given in Excel file.
  - **You won't need to draw any charts in the exam.**

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- Topic 3: Factor model regression and simulation
  - You need to use Excel/VBA functions to get regression results, such as LINEST, INTERCEPT, SLOPE, RSQ, INDEX, MATCH functions.
  - You cannot use Data Analysis Toolpak to generate regression results. (I will emphasize it in the exam paper.)
  - You need to know how to run Fama-Macbeth regression and use the individual assets/portfolios provided in the exam to test new pricing factors.
  - In the factor model simulation, you need to know how to use Data Table function to generate cross-sectional simulations in Excel, and write sub procedure in VBA.
  - In the exam, if you need to use new pricing factors, I will introduce the new factor in the exam paper.
  - The construction of factors is not required.



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- Topic 4: Option pricing models
  - Value a European option using Black-Scholes model is required.
  - Formulas in the Black-Scholes model, including option prices and Greeks, will be provided.
  - Value a European/American option using binomial tree
  - Pricing options using Monte Carlo method
  - You should also know how to estimate the parameters in the option model from the given data.