THE EDUCATION UNIVERSITY OF HONG KONG

Course Outline

Part I

Programme Title	**:**	**Bachelor of Arts in Personal Finance; all undergraduate programmes**
Programme QF Level	**:**	**5**
Course Title	**:**	**Quantitative Analysis in Finance**
Course Code	**:**	**BUS1049**
Department	**:**	**Department of Social Sciences and Policy Studies**
Credit Points	**:**	**3**
Contact Hours	**:**	**39**
Pre-requisite(s)	**:**	**Nil**
Medium of Instruction	**:**	**English**
Course Level	**:**	**1**

Part II

The University's Graduate Attributes and seven Generic Intended Learning Outcomes (GILOs) represent the attributes of ideal EdUHK graduates and their expected qualities respectively. Learning outcomes work coherently at the University (GILOs), programme (Programme Intended Learning Outcomes) and course (Course Intended Learning Outcomes) levels to achieve the goal of nurturing students with important graduate attributes.

In gist, the Graduate Attributes for Sub-degree, Undergraduate, Taught Postgraduate, Professional Doctorate and Research Postgraduate students consist of the following three domains (i.e. in short "PEER & I"):

- **P**rofessional **E**xcellence;
- **E**thical **R**esponsibility; **&**
- **I**nnovation.

The descriptors under these three domains are different for the three groups of students in order to reflect the respective level of Graduate Attributes.

The seven GILOs are:

1. Problem Solving Skills
2. Critical Thinking Skills
3. Creative Thinking Skills

4a. Oral Communication Skills

4b. Written Communication Skills

5. Social Interaction Skills
6. Ethical Decision Making
7. Global Perspectives

1. **Course Synopsis**

This course aims to provide students with some of the basic numerical and statistical methods required to perform quantitative analysis in finance. The course will start with some useful data organization and presentation concepts. We will then discuss basic calculus and probability, that are often used in financial and business applications. Students will also learn the frameworks of hypothesis testing and regression analysis for analyzing data and making judgments. Emphasis is placed on the application of quantitative methods in financial and business settings. The course will also include interactive lectures and computer lab sessions for students to have hands-on experience analyzing real-life financial data.

2. **Course Intended Learning Outcomes** (CILOs)

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

- $CILO_1$ Compute and use basic mathematical techniques, such as differentiation and optimization;
- $CILO_2$ Critically review, choose and employ the basic statistical concepts and descriptive analysis of data;
- $CILO_3$ Apply the concepts of random variables and probability distributions of financial data;
- $CILO_4$ Apply regression models to financial data analysis;
- $CILO_5$ Formulate implications and conclusions from statistical analysis.

3. **Content, CILOs and Teaching & Learning Activities**

Course Content	CILOs	Suggested Teaching & Learning Activities
Descriptive statistics: introduction to the types (time series, cross-section, panel, continuous, discrete) and major sources of data that are commonly used in finance; organizing and visualizing data; measures of central tendency and dispersion, as well as correlation.	$CILO_{2,3}$	Lecture; lecturer-led questions and answers (Q&A); problem-based learning activities; hand-on practices and calculations; group discussions
Basic mathematical techniques: differentiation; optimization.	$CILO_1$	Lecture; lecturer-led questions and answers (Q&A); problem-based learning activities; hand-on practices and calculations; group discussions
Probability; discrete and continuous random variables; expectation and variance; joint probability distributions of financial data; covariance; correlation; and independence; normal distribution.	$CILO_{3,4}$	Lecture; lecturer-led questions and answers (Q&A); problem-based learning activities; hand-on practices and calculations; group discussions
Sampling: samples and populations; random sampling;	$CILO_{2,3,4,5}$	Lecture; lecturer-led questions and

the distribution of the sample mean; point estimation; properties of estimators (unbiasedness, efficiency); confidence interval estimation.		answers (Q&A); problem-based learning activities; hand-on practices and calculations; group discussions
Hypotheses testing: null and alternative hypotheses; type one and type two errors; test procedures; applications	$CILO_{3,4,5}$	Lecture; lecturer-led questions and answers (Q&A); problem-based learning activities; hand-on practices and calculations; group discussions
Simple regression analysis: the mechanics of ordinary least squares (OLS) regression and its assumptions; total, explained and residual sums of squares, R^2. Applying and running a regression in Excel and using financial data.	$CILO_{4,5}$	Lecture; lecturer-led questions and answers (Q&A); problem-based learning activities; hand-on practices and calculations; group discussions

4. Assessment

Assessment Tasks	Weighting (%)	CILO
(a) Individual Assignments Students will be given individual assignment(s) on the topics discussed in quantitative analysis during the course.	60%	$CILO_{1,2,3,4,5}$
(b) Final Examination 2-hour examination on all topics discussed in class will be conducted at the end of the course. The coverage of questions is designed as comprehensively as possible throughout the course content on quantitative analysis in finance.	40%	$CILO_{1,2,3,4,5}$

5. Required Text(s)

Barnett, R.A., Ziegler, M.R., Byleen, K.E. & Stocker, C.J. (2018). *Calculus for Business, Economics, Life Sciences, and Social Sciences* (14th ed.). Pearson.

Levine, D.M., Szabat, K.A., Stephan, D.F. & Mariappan, P. (2022). *Business Statistics: A First Course* (8th ed.). Pearson.

6. Recommended Readings

Bennett, J., Briggs, W.L. & Triola, M.F. (2017). *Statistical Reasoning for Everyday Life* (5th ed.). Pearson.

Black, K. (2023). *Business Statistics for Contemporary Decision Making* (11th ed.). John Wiley & Sons, Inc.

Camm, J.D., Cochran, J.J., Fry, M.J., Ohlmann, J.W., Anderson, D.R., Sweeney, D.J. &

Williams, T.A. (2023). *Statistics for Business & Economics* (15th ed.). Cengage Learning.
Harshbarger, R.J. & Reynolds, J.J. (2018). *Mathematical Applications for the Management, Life, and Social Sciences* (12th ed.). Cengage Learning.
Holloway, A. (2023). *Data Analysis in Microsoft Excel: Deliver Awesome Analytics in 3 Easy Steps Using VLOOKUPS, Pivot Tables, Charts And More*.
Jacques, I. (2018). *Mathematics for Economics and Business* (9th ed.). Pearson.
Levine, D.M., Stephan, D.F. & Szabat, K.A. (2020). *Statistics for Managers Using Microsoft Excel* (9th ed.). Pearson.
Peck, R., Olsen, C. & Short, T. (2019). *Introduction to Statistics and Data Analysis* (6th ed.). Cengage Learning.
Ruppert, D. (2004). *Statistics and Finance: An Introduction*. Springer.
Slater, J. & Wittry, S. (2019). *Math for Business and Finance: an algebraic approach* (2nd ed.). New York: McGraw-Hill Education.

7. Related Web Resources

HyperStat Online Statistics Textbook	https://davidmlane.com/hyperstat/
OpenStax Introductory Business Statistics 2e	https://openstax.org/details/books/introductory-business-statistics-2e
OpenStax Calculus Volume 1	https://openstax.org/details/books/calculus-volume-1
Hong Kong Statistical Society	https://www.hkss.org.hk/
Census and Statistics Department, HKSAR Government	https://www.censtatd.gov.hk/en/

8. Related Journals

The Journal of Financial and Quantitative Analysis
Quantitative Finance
Mathematical Finance
Journal of Finance
International Journal of Qualitative Methods
Review of Quantitative Finance and Accounting
The Review of Financial Studies

9. Academic Honesty

The University upholds the principles of honesty in all areas of academic work. We expect our students to carry out all academic activities honestly and in good faith. Please refer to the *Policy on Academic Honesty, Responsibility and Integrity* (https://www.eduhk.hk/re/uploads/docs/00000000001633679892454 8BbN5). Students should familiarize themselves with the Policy.

10. Others

Nil

Last updated on 4 October 2024