ISOM5510 Data Analysis
Course Outline

LECTURE

Instructor: Dr. Baoqian PAN, Kris
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Office Hours: 1 hour after class or send an email to make an appointment.

Instructional Assistant: Elvis LEE
Room: 4065(LSK); Email: **imelvis@ust.hk**
Office Hours: send an email to make an appointment

Teaching Schedule: Aug 30 - Oct 18, Tuesday, 7:00 PM - 10:30 PM.
Teaching mode: Hybrid mode (face to face + ZOOM)
Teaching Venue: Business School Central (map).
Final Exam: Oct 18, 7:30 PM – 9:30 PM

OBJECTIVES AND INTENDED LEARNING OUTCOMES

The objective of the course is to introduce the fundamental knowledge of data analysis using statistical methods, including sampling schemes, statistical inference, and linear regression. We emphasize on
1. Close connection to real life and business practice,
2. Concepts and interpretation over computation practice through different formats of evaluation.
3. Hands-on experiences on data collection and analysis.

The learning goals of the course are to familiarize the students with
1. Quantitative Analysis Skill for Decision-making
   – Students are able to use a systemic and quantitative approach in analyzing business information for making effective business decisions.
2. Critical and Integrative Thinking
   – Students are reflective problem solvers, they are able to identify key issues in a business setting, and to formulate and apply innovative solutions.

COURSE MATERIAL

1. Lecture notes and exercise questions are downloadable from course website (http://canvas.ust.hk).
2. Reference book: Levine, Stephan, and Szabat. "Statistics for Managers Using Microsoft Excel", 9th Edition.
   " Introductory Business Statistics"
   (https://open.umn.edu/opentextbooks/textbooks/introductory-business-statistics-2017)
   (Note: The course is not based on a specific textbook. The relevant course materials are the lecture notes.)

3. Software: Excel.

SYLLABUS
This syllabus is subject to change in the event of extenuating circumstances.

Accelerator 1: Descriptive Statistics
- Type of data
- Graphical method
  o Histogram, bar chart, pie chart, frequency polygons, scatter plot, line chart
  o Pareto chart, slope graph, bubble plot, heat map, stacked/side-by-side bar chart, scatter plot matrix, pivot chart
  o Parallel coordinate plot, tree map, graphical information systems,
  o Interactive graphs
- Numerical method
  o Measure of central tendency (mean, median, mode),
  o Measure of variation (range, interquartile range, variance, standard deviation)
  o Box plot

Accelerator 2: Basic Probability
- Basic concept
- Probability rules
- Probability trees

Accelerator 3: Decision Making Under Uncertainty
- Discrete random variable:
  o Application: Equity selection, decision trees and sensitivity analysis
- Continuous random variable:
  o Normal distribution

Topic 1: Introduction
- Basic concept of Statistics
- Sampling method
  o SRS, systematic sampling, stratified sampling, cluster sampling, multistage sampling
  o Avoid sampling bias
- Common data problem & data cleaning

Topic 2: Normal Distribution
- Normal distribution & normal model
- Empirical rule
- Application: Calculate value at risk

Topic 3: Sampling Variation and Confidence Interval
- Sampling distribution of the mean and proportion
- CI of the mean
- CI of the proportion

- Sample size determination

Topic 4: Hypothesis Testing
- t-test of the mean
- Z-test of the proportion
- Comparing two population means

Topic 5: Modeling for Decision Making – Correlation
- Covariance and correlation
- Testing the significance of the correlation
- Spurious relationships and notions of causality

Topic 6: Modeling for Decision Making – Simple Linear Regression
- Simple linear regression model
- Assumption and diagnosis checking
- Fitting curve to data – Logarithmic regression

Topic 7: Modeling for Decision Making – Multiple Regression
- Multiple linear regression model
- Multicollinearity
- Using dummy variable, slope dummy variable and interaction variable

EVALUATION

Your grade in the course is based on:
● In-class exercise and homework 40% ● Final Exam 60%

A. In-class exercise and homework 40%.

Note: 1) There should be 3 persons in each group. Please sign the name on the cover page of a hard copy of the in-class exercise or homework; otherwise, you will have no record for the in-class exercise or homework. The excuses, i.e. "forget to sign", "Other members submit the quiz or exercise without notice" etc. are not accepted.
2) Freeriding is not allowed. If you don't join the discussion of the in-class exercise or homework, other members of group have the right to submit the in-class exercise or homework without your permission. In addition, if you have little contribution to the discussion (e.g. Show up without preparation), your groupmates can send an email to notify me and my TA.
3) For in-class exercise, you need to submit it within a fixed time period (E.g. 15 minutes).
4) For assignment, you need to submit it by next Monday 11:59 p.m.

B. Final Exam 60% (2 hours, individual exam. Contents cover Topic 1 to Topic 7.).

Note: 1) Students who fail to attend a scheduled examination will be given zero marks for that examination. 2) Appeals for make-up examinations on the grounds of special circumstances, such as medical reasons with valid documentation, could be granted in consultation with the HKUST MBA Academic Director.

GRIEVANCE PROCEDURE

If you disagree with grades that have been assigned to your work, you have the possibility to meet instructors within one week after the grades have been published in the course website. Be specific about what it is that you don't agree with.

ACADEMIC INTEGRITY

Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of other groups, or tampering with the academic work of other groups. All exam answers must be your own, and you must not provide any assistance to other students during exams. Current university policy on academic dishonesty is "if a student is discovered cheating however minor the offense, the course grade will appear on the students' record with an X, to show that the grade resulted from cheating." This X grade stays on the record until graduation. If the student cheats again and "earns" another X grade, the student will be dismissed from the university.