Master of Science in Global Operations
2022-2023 Intake

ISOM5510 Data Analysis
(Sep-Oct 2022)

Instructor:
Dr. Baoqian PAN, Kris
Department of Information Systems, Business Statistics and Operation Managements
Room: 5041 (LSK Business building);
Email: **ismtpbq@ust.hk**
Office Hours: 1 hour after class or send an email to make an appointment.

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

Teaching Schedule:
Accelerator:
Aug 24, 25. (Total 2 sessions)
Time: 2:30pm – 6:00pm.
Venue: LSK2001 (Mixed mode: ZOOM Meeting ID: 986 0706 3832, Passcode: krispan)

Lecture:
Sept 1 - Oct 13, every Thursday. (Total 7 sessions)
Time: 2:00pm – 5:30pm;
Final Exam: Oct 20, 2:00pm-5:30pm
Venue: LSKG003 (Mixed mode: ZOOM Meeting ID: 966 9027 0318, Passcode: krispan)

Learning Goals:
The 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.

Teaching / Learning Methodology:
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. Closer 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.

Reference Book(s):
"Essentials of Modern Business Statistics", Anderson, Sweeney, Williams, 6th edition.

The course is not based on a specific textbook. The relevant course materials are the lecture notes.

Assessment Methods:
A combination of typical assessment methods is listed as below.

● 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 group-mates 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. 10 minutes).
4) For assignment, you need to submit it by next Wednesday 11:59 p.m.

B. Final Exam 60% (2 hours, individual exam.).

Note: 1) Students who fail to attend a scheduled examination will be given zero mark 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 MSGO Academic Director.

Course Content:
This syllabus is subject to change in the event of extenuating circumstances.

Accelerator 1: Descriptive Statistics
- Graphical method
- Numerical method

Accelerator 2: Basic Probability
- Basic concept
- Relationship between events

Accelerator 3: Decision Making Under Uncertainty – Random Variable
- Discrete random variable
- Application: Equity selection
- Continuous random variable

Topic 1: Introduction
- Basic concept of Statistics
- Sampling method
  - SRS, Systematic sampling, stratified sampling, cluster sampling, multistage sampling
  - 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

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 coefficient
- Spurious relationships and notions of causality

Topic 6: Modeling for Decision Making – Simple Linear Regression
- Simple linear regression model
- Assumption and diagnosis checking

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

Course Website:
http://canvas.ust.hk