The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2019
Course Outline

CUSA1016 Statistical Reasoning and Data Exploration
統計推理及數據探索

Introduction:
This course aims at introducing the ideas of statistical reasoning and understanding the characteristics of data. Students will learn to draw scientific conclusions through hypothesis testing, identify the properties of various statistical studies, and summarize data through scatter plot and contingency table. Through group discussions and computer lab demonstrations, students will learn to assess the reliability of statistical studies appeared in the newspaper articles, and identify possible issues when visualizing the data.
本課程旨在介紹統計推理的想法和理解數據的特徵。學生將學習透過假設檢驗作出科學結論，識別各種統計研究的屬性，並通過散點圖和列聯表去概述數據。通過小組討論和實驗室演示，學生將學習如何評估報紙文章中出現的統計研究的可靠性，並識別出數據圖像可能出現的問題。

Learning outcomes:
Upon completion of this course, students should be able to:
1. Learn about collecting and summarizing the data;
2. Draw scientific conclusions using hypothesis testing;
3. Identify various types of statistical studies and their properties;
4. Apply statistical tools to visualize various types of data; and
5. Identify the misuse of statistics in everyday life.

This course will lay a solid foundation for the students to start the statistics courses at the university level.

Medium of Instruction: Cantonese supplemented with English

Organising Unit:
Department of Statistics, CUHK

Teacher:
Dr. LEE Pak Kuen Philip
Department of Statistics, CUHK
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Course Content:

29 July 2019 (Monday) 9:30am– 12:30pm 2:00pm–4:00pm	Lecture: • Uses and Misuses of Statistics • Statistics – The Basics - Population, Sample, Parameter, Statistic and Randomness - Type of Variables: Nominal, Ordinal, Discrete and Continuous - Data Validity, Reliability and Biasness • Hypothesis Testing – A powerful tool to draw scientific conclusions Computer Lab Activities: • Hypothesis Testing in Microsoft Excel Assessment: • Short answer test
31 July 2019 (Wednesday) 9:30am– 12:30pm 2:00pm–4:00pm	Lecture: • Types of Statistical Studies: - Observational Studies - Randomized Experiments - Sample Surveys • Reading the News – 7 critical components on statistical studies • Pitfalls when asking questions in a survey/experiments Discussion: • Issues on statistical studies from selected newpaper articles Assessment: • Short answer test
2 August 2019 (Friday) 9:30am– 12:30pm 2:00pm–4:00pm	Lecture: • Relationships between Measurement Variables - Scatter Plot, Correlation, Linear and Non-linear Regressions - Issues: Extrapolation, Separated Points, Correlation vs Causation • Relationships between Categorical Variables - Contingency Tables, Relative Risks - Issues: Misleading Statistics about Risk, Simpson's Paradox Computer Lab Activities: • Data Visualization in Microsoft Excel Assessment: • Short answer test
3 August 2019* (Saturday) 9:30am– 12:30pm 2:00pm–4:00pm	Makeup class

Duration	3 whole day sessions (total 15 contact hours)
Date	29, 31 July 2019 and 2 August 2019 3 August 2019* (make up class)
Time	29July 2019: 09:30am– 12:30pm; 2:00pm–4:00pm 31 July 2019: 09:30am– 12:30pm; 2:00pm–4:00pm 2 August 2019: 09:30am– 12:30pm; 2:00pm–4:00pm 3 August 2019*: 09:30am – 12:30pm; 2:00pm–4:00pm (make up class)
Venue	The Chinese University of Hong Kong
Enrollment	30
Expected applicants	Students who are studying S4-S6 with good knowledge in mathematics
Tuition Fee	HKD 2,800.00
Credit	1 Academic Unit Certificates or letters of completion will be awarded to students who attain at least 75% attendance.

* This date is reserved for make up classes in case there is any cancellation of classes due to bad weather or other factors.