

Course Outline

Course Code : DAO1704X
Course Title : Decision Analytics using Spreadsheets
Class Date : From 14/8/2023 To 17/11/2023
Semester : Semester 1, Academic Year AY2023/24
Faculty : Dr Yi-Liang Tung
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Overview

We are now at the era of big data. Companies are able to collect a tremendous amount of data, very often more than necessary, with ease. "Information is Power" is no longer valid if companies are not able to make correct decisions timely in terms of the data available. The use of business analytics for modelling and decisions represents the future of best practices for the success of tomorrow's companies.

This course prepares students with theory and skills to capture business insights from data for decision making using Spreadsheets. Practical examples and cases with rich data are used to stimulate students' interest and foster their understanding of the use of Business Analytics in management or business fields.

Course Objectives

Students are expected to become proficient in the extensive use of Spreadsheets in the business environment. The course will enable students to consider the data dimension in making decisions at all levels in the organizational settings.

Assessment

Assessment Components	Weightage
1. Project Report (Group)	15%
2. Class Participation (Individual)	15%
3. Quizzes (Individual)	15%
4. Assignments (Individual)	15%
5. Final Exam (Individual)	40%

Schedule and Outline

Lesson/ Week	Session (lesson summary or outline / learning objectives / preparation / cases & assignments / follow-up readings & resources)
1	Introduction to business analytics. <ul style="list-style-type: none"> • Express interest in data analytics • Recall basic probability concepts

2	Basic Probability Theory <ul style="list-style-type: none"> • Compute conditional probabilities • Understand and use Bayes' rule
3	Discrete Probability Distributions <ul style="list-style-type: none"> • Differentiate between Binomial and Poisson distributions • Solve questions involving discrete probability distributions • Apply Excel's probability functions to compute the required probabilities
4	Continuous Probability Distributions <ul style="list-style-type: none"> • Differentiate between discrete and continuous probability distributions • Solve questions involving continuous probability distributions • Apply Excel's probability functions to compute the required probabilities
5	Joint Probability Distribution <ul style="list-style-type: none"> • The concept of joint probability distributions • Covariance and correlation • A sum of random variables
6	Case studies on Probability distributions
7	Introduction to Simulation Modelling <ul style="list-style-type: none"> • Use Excel to simulate a variety of random variables • Carry out Simulation to analyse business decision problems
8	Decision Trees <ul style="list-style-type: none"> • Illustrate a decision tree and its power in decision making • Use decision tree to make business decisions under uncertainty
9	Introduction to Linear Optimization <ul style="list-style-type: none"> • Formulate a Linear Programming (LP) mathematical model • Solve the optimal solution of an LP using Excel solver
10	Geometry of Linear Optimization <ul style="list-style-type: none"> • Feasible region of the LP • Constraints of the LP • Optimal solution of the LP
11	Sensitivity Analysis and Shadow Prices in Linear Optimization <ul style="list-style-type: none"> • Explain what are shadow prices • Understand allowable increase and decrease • Interpret a sensitivity report
12	Introduction to Discrete Optimization <ul style="list-style-type: none"> • Construct binary constraints • Logical constraint formulation • big-M notation
13	Applications of Optimization

General Guide & Reading (e.g. Case preparation guide, project report guide, main textbook & supplementary materials, etc)

Textbook:

AE Business Analytics: Data Analysis & Decision Making, 7th Edition

S. Christian Albright, Wayne L. Winston
ISBN-13: 9789814878180 | ISBN-10: 9814878189

Academic Honesty & Plagiarism

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Plagiarism is 'the practice of taking someone else's work or ideas and passing them off as one's own' (The New Oxford Dictionary of English). The University and School will not condone plagiarism. Students should adopt this rule - You have the obligation to make clear to the assessor which is your own work, and which is the work of others. Otherwise, your assessor is entitled to assume that everything being presented for assessment is being presented as entirely your own work. This is a minimum standard. In case of any doubts, you should consult your instructor.

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- <http://www.nus.edu.sg/registrar/administrative-policies-procedures/acceptance-record#NUSCodeofStudentConduct>
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