Course Outline

Course Code : DAO1704X
Course Title : Decision Analytics using Spreadsheets
Class Date : From 13/1/2025   To 18/4/2025
Semester : Semester 2, Academic Year AY2024/25
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Overview

We are now in the era of big data, where companies can easily collect vast amounts of information, often exceeding what is necessary. The concept that "Information is Power" no longer holds true unless organizations can leverage that data to make timely and accurate decisions. Employing business analytics for modelling and informed decision-making is crucial for companies aiming to adopt best practices and achieve future success.

This course equips students with both the theoretical foundation and practical skills needed to extract valuable business insights from data and support decision-making through the use of spreadsheets. Through engaging examples and comprehensive case studies, students will develop a strong understanding of how Business Analytics is applied in management and business contexts.

Course Objectives

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

Assessment

Assessment Components	Weightage
1. Final Project and Presentation (Group & individual)	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 the course

2	Basic Probability Concepts • Conditional probability concept • Bayes' theorem • Joint probability table
3	Discrete Probability Distributions • 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 • 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 • The concept of joint probability distributions • Covariance and correlation • A sum of random variables
6	Decision Trees • Illustrate a decision tree and its power in decision making • Use decision tree to make business decisions under uncertainty
7	Midterm Quiz Preparation
8	Introduction to Simulation Modelling • Use Excel to simulate a variety of random variables • Carry out Simulation to analyse business decision problems
9	Case Studies on Simulation Modelling
10	Introduction to Linear Optimization • Formulate a Linear Programming (LP) mathematical model • Solve the optimal solution of an LP using Excel solver • Geometry of linear optimization
11	Sensitivity Analysis and Shadow Prices in Linear Optimization • Explain what shadow prices are • Understand allowable increase and decrease • Interpret a sensitivity report
12	Introduction to Discrete Optimization • Construct binary constraints • Logical constraint formulation • big-M notation
13	E-Presentation: Group Project

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

Lecture notes, case studies and teaching videos

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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.

Additional guidance is available at:
- Administrative Policies
- http://www.nus.edu.sg/registrar/administrative-policies-procedures/acceptance-record#NUSCodeofStudentConduct
- http://nus.edu.sg/osa/resources/code-of-student-conduct