NATIONAL UNIVERSITY OF SINGAPORE
NUS Business School
Department of Analytics & Operations

<u>**DAO1704X Decision Analytics Using Spreadsheet**</u>

Lecturer: Dr. TUNG, Yi-Liang

<u>**Session**</u>: Semester 2, 2020/2021

Description

We are now at the era of big data. Companies are able to collect a tremendous amounts 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 "Information is Power" is no longer valid if companies are not able to make correct decisions timely out of the data. The use of business analytics for modeling and decisions represents the future of best practices for tomorrow's success companies.

This course prepares students with fundamental theory and basic instruments to capture business insights from data and thus make good managerial decisions using spreadsheets. Quantitative models and tools such as Decision Analysis, Simulation Modeling and Mathematical Optimization are covered to demonstrate the use of scientific methods in business decision making. Practical examples and cases with rich data are used to stimulate students' interest and their understanding in Business Analytics.

Objectives

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

Course Outline

1) **Understanding Data**
   a) Data Management and Visualization with Pivot Table
   b) Laws of Probability, Bayes Theorem, Covariance
   c) Basic Probability Distributions

2) **Managerial Decision Analysis**
   a) Decision Tree Models and Analysis using Spreadsheet
   b) Sensitivity Analysis

3) **Simulation Modeling: Concepts and Practice**
   a) Random Number Generators
   b) Using the Sample Data for Analysis
   c) Using Histogram and Other Excel Charts to Summarize and Visualize Simulation Results for Decision Making

4) Optimization Models and Their Applications
  a) Formulating Management Problems
     i)   Linear Optimization Model
     ii) Nonlinear Optimization Model
     iii) Discrete Optimization Model
  b) Using Excel Solver to obtain the optimal solution of a linear programming problem and sensitivity analysis

Reading List

Compulsory reading:
Business Analytics: Data, Modelling & Application, 1st edition 2020, Cengage Publishing

Supplementary reading:
"The Analytics Edge" by Allison K. O'Hair, Dimitris Bertsimas, and William R. Pulleyblank

Course Package

Prerequisites

Fundamental skills in Excel.

Weightage of Assessment

Continuous Assessment:
Class Participation	15%
Group Project	15%
Quiz	15%
Assignments	15%

Final Examination   40%