Course Outline

Course Code   : DBA4812
Course Title   : Supply Chain Analytics
Class Date   : From 12/1/2026   To 17/4/2026
Semester   : Semester 2, Academic Year 2025-26
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Overview

Background and Introduction to the Course

In today's world customer is the king. Delivery to meet a customer's requirement is very important. The importance of timely delivery grew multi-fold after the advent of COVID-19. The customer has access to phenomenal amount of data, is overcome with choices.

Since 1990's when the terminology Analytics was coined, some of today's giants like - Netflix, Marriott's, Boston Red Sox, Capital One, Amazon …. succeeded based on a single common denominator- all excelled in their ability to manage their data, make sense out of data, and strategize based on data.
Today, Analytics has become a very important competitive tool. This was first brought to focus by Thomas Davenport in his book 'Competing on Analytics'. Thomas Davenport, in his article titled "Competing on Analytics" in Harvard Business Review, 2006, has said "Some companies have built their very businesses on their ability to collect, analyse and act on data. Every company can learn from what these firms do."

Analytics has become a key tool to tackle a whole range of business problems- be it pricing, selecting which market to launch a product, deciding what storage capacity to build or planning when to start or stop production or comparing and selecting based on a plethora of supply chain options

We believe, in this course that students should build a fundamental knowledge and control over the data available to them through a choice of Analytics concepts. Analytics knowledge in 21st century has become as important and significant as programming language was in 1980's and 1990's.

Course Objectives

Fundamental Analytics concepts are same across all application areas. We will address the Analytics concepts course focussing on the supply chain professional perspective We will address the issues as a supply chain professional would address the situations focusing on his/ her ability to manage with data available to him/ her.
The course will address four key and relevant aspects of Business Analytics – viz.

- Descriptive Analytics
- Inferential Analytics
- Predictive Analytics
- Prescriptive Analytics

We will dwell in a variety of tools ranging from:

- Revisiting fundamental descriptive statistical and graphic tools with their appropriate usage in descriptive Analytics
- Understand how to interpret sampling data in Inferential Analytics
- Prescribing solution in deterministic situations using decision modelling tools like linear, integer, non-linear programming in Prescriptive Analytics.
- Prescribing solution in a variety of probabilistic situations through Monte Carlo simulation
- Predicting what will happen using forecasting tools when data is available and guesstimation when very little data is available , in Predictive Analytics

During the course, we will use extensively and only Microsoft Excel as an analytics support tool. As a part of the course the student will experience challenges in live data analytics situations - wherein students will observe some of the challenges faced while going through the entire gamut of deciding what data to collect, data compilation, data analysis, data interpretation and using it as a decision-making tool.

Assessment

Assessment Components	Weightage
Individual Simulation Assignment	10%
Group Presentation on topic alloted	10%
Group Case Assignments	15%
Group Project	20%
Individual Midterm test	15%
Individual Final Test	30%

Schedule and Outline

Week		Session
1		Analytics as a competitive strategy: Essential do's and don'ts of data handling and care while dealing with data; Classifying data
2		**Descriptive Analytics:** Summarizing data and interpreting the data set with a case analysis
3		**Descriptive Analytics:** Tools for dealing with uncertainty and using distribution characteristics
4		**Descriptive Analytics:** Testing for a distribution with focus on normality testing and application situation
5		**Predictive Analytics:** Introducing forecasting, planning and error measurement. Identifying components and choosing models
6		**Predictive Analytics:** Key forecasting techniques when data is available- Exponential smoothing, regression, seasonality basics, CMA
7		**Midterm test** **Prescriptive Analytics:** Introducing building models with data
8		**Prescriptive Analytics**: Data Modelling with graphical solution; Using Excel's Solver for LP applications. Introducing NLP
9		**Prescriptive Analytics**: Network Tools – Minimum Spanning Tree, Shortest Path Algorithm, Vehicle Routing , Transportation problems
10		**Predictive Analytics:** Introduction to using the concept of Monte Carlo simulation while handling probabilistic data- storage capacity application
11		**Predictive Analytics**: Designing Monte Carlo simulation for numerous practical applications situation; storage capacity application
11		**Inferential Analytics**: The sampling approach to analytics. Central Limit Theorem and estimating with samples
12		**Inferential Analytics:** The world of formulating hypothesis, testing hypothesis and its applications
13		**Final Test**

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

Reference Text: Business Analytics (3rd Edition)- James R Evans - Pearson Publishers. Supplementary material and problem sheets will be provided for each session in Canvas.

Academic Honesty & Plagiarism

Academic integrity and honesty is essential for the pursuit and acquisition of knowledge. The University and School expect every student to uphold academic integrity & honesty at all times. Academic dishonesty is any misrepresentation with the intent to deceive, or failure to acknowledge the source, or falsification of information, or inaccuracy of statements, or cheating at examinations/tests, or inappropriate use of resources.

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