Course Outline

Course Code : DBA3711
Course Title : Stochastic Models in Management
Class Date : From 11/8/2025 to 14/11/2025
Semester : 1, Academic Year 2025/2026
Faculty : Professor Hanqin Zhang
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Overview

Stochastic Models in Management make use of analytical methods (in particular, probabilistic method) to distil intelligence for business leaders' decision-making. Thus, this module is concerned with modelling, analyzing and solving quantitative problems in management, and shall find applications in fields like finance, economics, marketing science, operations management, service management, logistics, and engineering.

Course Objectives

As an introductory module, we strive for breadth, giving an overview of several practical approaches, as well as sufficient depth, so as to provide a substantial feel for the discipline and a good foundation for further studies. The course objective is to deliver

- Practical, Hands-On Experience: Work with real-world data to bridge theory with practice;
- In-Demand, Career-Ready Skills: Learn to model, analyze, and solve complex quantitative problems, giving you a competitive edge in today's data-driven market. This sets you apart from peers who just use out-of-box models;
- Managerial Insights: Discover how to transform quantitative solutions into strategic managerial decisions, enhancing your leadership capabilities;
- Diverse Applications: Whether you're in finance, marketing, operations, or any other field, this course provides versatile skills that are applicable across all business sectors.

Topics include discrete-time Markov chains, continuous-time Markov chains, the Poisson process, the renewal reward theory, queueing models, stochastic inventory model, production planning models, customer brand-switching models, insurance contract models, and optimal staffing problems in service management.

Assessment

Assessment Components	Weightage
Class Participation	20%
Assignment (2)	20%
Project	20%
Test I	20%
Test II	20%

Reference Books:

[1] Feldman, R.M. and C. Valdez-Flores, *Applied Probability and Stochastic Processes,* 2nd edition, Springer, 2010.

[2] Ross S., *Introduction to Probability Models*, 10th edition, Academic Press, 2010.
[3] Durrett R., *Essentials of Stochastic Processes*, 2nd edition, Springer, 2012.

Couse Material Delivery Format:

For each topic, we first spend about one hour to discuss its concepts and principles. Then use E to analyze some real examples related to this topic, and further enhance our understanding on the concepts and principles.