

Mother Teresa Women's University, Kodaikanal

Department of Mathematics

Course: Ph.D

Specialized Area of Study: Inventory Management and Control

SYLLABUS

Unit 1: Deterministic lot size models and their extensions

Introduction – The simplest lot size model – No stock outs – Additional properties of the model, An example – Accounting for integrality of demand – Case where backorders are permitted – The lost sales case.

The case of a finite production rate – Constraints – Constraints; An example – Periodic review formulation – Quantity discounts – “All units” discounts – Incremental quantity discounts.

Unit 2: Probability theory and stochastic processes

Introduction – Basic laws of probabilities – Discrete random variables – Continuous random variables – Expected values – Time averages and Ensemble averages – Probabilistic description of demands – Joint distributions – Convolutions – Markov processes discrete in space and time – Markov processes discrete in space and continuous in time – Other types of Markov processes – Properties of the Poisson distribution – The normal distribution – Properties of the normal distribution.

Unit 3: Lot size-reorder point models with stochastic demands

Introduction – Heuristic approximate treatment of the backorders case – Heuristic approximate treatment for the lost sales case – discussion of the simple models and a numerical example – Exact formulas for the backorders case with Poisson demands and constant procurement lead time – An important special case – The normal approximation – An example involving the use of the exact form of K .

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Unit 4: Periodic review models with stochastic demands

Introduction – Simple, Appropriate $\langle R, T \rangle$ models – The exact formulation of the $\langle nQ, r, T \rangle$ model for the backorders case with Poisson demands and constant lead times – Approximate form of the $\langle nQ, r, T \rangle$ model for large Q – The $\langle nQ, r, T \rangle$ model for normally distributed demands – Exact equations for $\langle R, T \rangle$ models – The $\langle Q, r \rangle$ model as the limit as $T \rightarrow 0$ of the $\langle nQ, r, T \rangle$ model.

Unit 5: Single period models

Introduction – The general single period model with time independent costs- Examples – Constrained multiple item problems – Single period models with time dependent costs - Marginal analysis.

Text Book:

1. Analysis of Inventory Systems, G. Hadley (University of Chicago), T.M. Whitin (University of California, Berkeley), Prentice-Hall, 1963.