

Python Programming for Business Modelling

SYLLABUS OF GE-2

Unit I (Week 1-3): Introduction to Production and Inventory Management, Different types of costs in inventory system, Selective inventory classification (VED, XML, FNSD, ABC) and its use in controlling inventory.

Unit II (Week 4-10): Deterministic continuous review models: Economic order quantity (EOQ) model with and without shortages, Finite replenishment rate Inventory models without and with planned shortages. Determination of reorder point, Quantity discount models.

Unit III (Week 11-12): Probabilistic inventory models: Single period probabilistic inventory models with discrete and continuous demand.

Unit IV (Week 13-15): Introduction to Production Planning and Scheduling, Aggregate production plan, Formulation of lot size production problem: Wagner and Whitin algorithm. Basic concepts of Just-in-Time (JIT) and Material Requirement Planning (MRP).

Practical component (if any) -

Practical/Lab to be performed on a computer using OR/Statistical packages

1. Problems based on selective inventory classification. (ABC and FNS analysis)
2. To find optimal inventory policy for EOQ model.
3. To find optimal inventory policy for EOQ model with finite supply.
4. To find optimal inventory policy for EOQ model with backorders.
5. To solve all units quantity discounts model.
6. To solve Incremental quantity discount model
7. To find optimal inventory policy for Probabilistic inventory model with discrete demand.
8. To find optimal inventory policy for Probabilistic inventory model with continuous.
9. Solution of procurement/production scheduling model.

Essential/recommended readings

- Axsäter, S. (2015). *Inventory control* (3rd Edition). Springer.
- Buffa, Elwood S., & Sarin, Rakesh, K. (2009). *Modern Production/Operations Management* (8th ed.). Wiley, India.
- Hadley, G., & Whitin, T. M. (1963). *Analysis of inventory systems*. Prentice-Hall.
- Heizer, J., & Render, B. (2011). *Operations Management* (10th ed.). Pearson's Publication.
- Johnson, L.A., & Montgomery, D.C. (1974) *Operations Research in Production Planning, Scheduling and Inventory Control*. Wiley, New York.
- Waters, D. (2008). *Inventory control and management*. (2nd ed.). John Wiley & Sons.

Suggestive readings

- Naddor, E. (1966). *Inventory Systems*. Wiley.
- Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (3rd ed.). Wiley.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

Nomenclature of certificate/diploma/degrees:

- ✓ After securing 44 credits (from semester I and II), by completing one year of study of the UG Programme with Operational Research as a single core discipline, if a student exits after following due procedure, he or she shall be awarded **Undergraduate Certificate in** Operational Research.
- ✓ After securing 88 credits (from semester I, II, III & IV), by completing two years of study of the UG Programme with Operational Research as a single core discipline, if a student exits after following due procedure, he or she shall be awarded **Diploma in** Operational Research.
- ✓ After securing 132 credits (from semester I to VI), by completing three years of study of the UG Programme with Operational Research as a single core discipline, if a student exits after following due procedure, he or she shall be awarded **Bachelor of Science (Honours) in** Operational Research.
- ✓ After securing 176 credits (from semester I to VIII), by completing four years of study of the UG Programme with Operational Research as a single core discipline and writes dissertation, the student shall be awarded **Bachelor of Science (Honours with Research) in** Operational Research.
- ✓ After securing 176 credits (from semester I to VIII), by completing four years of study of the UG Programme with Operational Research as a single core discipline and engages in Academic Project/Entrepreneurship, the student shall be awarded **Bachelor of Science (Honours with Academic Project/Entrepreneurship) in** Operational Research.