

MAST 223
Introduction to Stochastic Methods of Operations Research
Winter 2017

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Office Hours: Tuesdays, Thursdays, 10:30-12:15; Wednesday, 12:00-13:00.

Text: *Operations Research: Applications and Algorithms*, 4th Edition, by W. L. Winston.

Calculators: The only calculators approved by the Department allowed in the class test and final examination for this course are the **Sharp EL 531** and the **Casio FX 300MS**.

Test: There will be one class test during the course. Missed test cannot be made up.

Final Exam: There are no exemptions from this three-hour exam.

Final Grade: The final grade will be based on the higher of **(a)** or **(b)**:

- a) 15% for the assignments, 25% for the class test, and 60% for the final exam.
- b) 15% for the assignments, 15% for the class test, and 70% for the final exam.

IMPORTANT: PLEASE NOTE THAT THERE IS NO "100% FINAL EXAM" OPTION IN THIS COURSE.

NOTE: It is the Department's policy that tests missed for any reason, *including illness*, cannot be made up. If you miss the midterm test because of illness (*to be confirmed by a valid medical note*), the final exam can count for 85% of your final grade.

- Notes:**
- a. The midterm test will take place in class on Thursday, March 2, 2017.
 - b. Midterm test will cover until weeks 7 inclusively.
 - c. The final examination will cover everything taught in the course.
 - d. Assignments will be handed bi-weekly and collected in class.
 - e. Late assignments will not be accepted.

Weeks	Chapters
1	<p>Chapter 12: Review of Probability Basic Rules of Probability. Bayes' Rule. Random Variables, Mean, Variance, and Covariance. The Normal Distribution. Z-Transforms.</p>
2 & 3	<p>Chapter 15: Deterministic Inventory Models Introduction to Basic Inventory Models. Basic Economic Order Quantity Model. Computing the Optimal Order Quantity. The Continuous Rate EOQ Model. The EOQ Model with Back Orders Allowed. When to Use EOQ Models. Multiple Product EOQ Models.</p>
4 & 5	<p>Chapter 16: Probabilistic Inventory Models Single-Period Decision Models. The Concept of Marginal Analysis. The News Vendor Problem: Discrete Demand. The News Vendor Problem: Continuous Demand. Other One-Period Models. The EOQ with Uncertain Demand. Periodic Review Policy. Exchange Curves.</p>
6 & 7	<p>Chapter 17: Markov Chains Introduction to Stochastic Process. Introduction to Markov Chain. n-step Transition Probabilities. Classification of States in a Markov Chain. Mid-Term Test</p>
8	<p>Chapter 17: Markov Chains Steady-State Probabilities. Mean First Passage Times. Absorbing Chains. Work-Force Planning Models.</p>
9, 10 & 11	<p>Chapter 20: Queuing Theory Introduction. Modeling Arrival and Service Processes. Birth-Death Processes. The M/M/1/GD/∞/∞ Queuing System. The M/M/1/GD/c/∞ Queuing System. The M/M/s/GD/∞/∞ Queuing System. The M/G/∞/GD/∞/∞ and GI/G/∞/GD/∞/∞ Models. The M/G/1/GD/∞/∞ Queuing System. Finite Source Models. Exponential Queues in Series and Open Queuing Networks. The M/G/s/GD/s/∞ System. Checking Inter-arrival Times & Service Times.</p>
12 & 13	<p>Chapter 21: Simulation & Review Introduction. Discrete Event Simulation. Monte Carlo Simulation. Simulation with Continuous Random Variables. Stochastic Simulation.</p>