

IE 334 Operations Research III – Stochastic Problems (3 2 4) (ECTS: 7)
(2016-2017 Spring) – Tentative Syllabus



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Catalog Description:

Introduction; review of basic concepts of probability and properties of random variables; basics of decision making under uncertainty; discrete-time Markov chains; exponential distribution and Poisson process; queuing theory; probabilistic inventory models; probabilistic dynamic programming.

Text Book:

Operations Research - Applications and Algorithms, Wayne L. Winston, 4th Edition, Cengage Learning, 2004.

Supplementary Books:

- Introduction to Operations Research, Frederick S. Hillier and Gerald J. Lieberman, 10th Edition, McGraw Hill, 2015.
- Introduction to Probability Models, Sheldon M. ROSS, 10th Edition, Elsevier, 2010

Course Outline:

1. Review of Probability, Random Variables, Sample Space, Conditional Probability, Distributions and Expectations.
2. Basic Principles of Decision Making Under Uncertainty, Decision Criteria
3. Utility Theory, Decision Trees
4. Markov Chains: *n-Step Transition Probabilities, Classification of States*
5. Markov Chains: *Mean First Passage Times, Steady State Probabilities*
6. Markov Chains: *Absorbing Chains, Applications of Markov Chains*
7. Properties of Exponential Distribution, Counting Process, Poisson Process
8. Queuing Models: *Terminology, Arrival and Service Processes, Birth-and Death Processes*
9. Queuing Models: *M/M/1, M/M/s queues*
10. Queuing Models: *M/G/∞, GI/G/∞, M/G/1 queues, Finite Source Models*
11. Probabilistic Inventory Models: *The Newsvendor Problem*
12. Probabilistic Inventory Models: *The EOQ with uncertain Demand ((r,q) and (s, S) models)*
13. Probabilistic Inventory Models: *Service Level Measures*
14. Review

Class meeting hours:

Mon. 12:20-14:10 (LA 14)
Tue. 13:20-14:10 (LA 15)
Recitation; Sec.1: Thu. 13:20-15:10 (RB 03)
Sec.2: Fri. 15:20-17:10 (L 111)

Office hour: To be announced later

Academic Integrity: All students admitted to Çankaya University are expected to act honestly and ethically. Therefore, any form of dishonesty will not be tolerated. Every student should declare his/her understanding and belief in the Honor Code stated by the department for the examinations and assignments.

Make-up Exams: If a student misses midterm exam or final exam and has a valid excuse for his/her absence, a make-up exam will be given. ***A make-up exam may have a different format and may contain different type of questions than the regular exam.***

Attendance: Attendance will be taken every lecture hour. It is strongly recommended to attend all the lecture hours to understand the course material.

Conditions that lead to the letter grade “NA”:

- Not attending the *Midterm Exam* (or its makeup) or the *Final Exam* (or its makeup);
 - If you fail to take the midterm exam (or its makeup), you will NOT be able to take the final exam and you will receive the letter grade NA.
 - If you are eligible to take the final exam but fail to take it (or its makeup) you will receive the letter grade NA.

Course website:

- Communication will be made through course page at <http://webonline.cankaya.edu.tr>
- Announcements, lecture notes, grades, and other information will be uploaded to course page.
- Every student should check the course page regularly. They are also responsible for printing the course material (lecture notes, exercises, etc.) from the course web page.

Exams and Homework Assignments:

- There will be one midterm exam, final exam, and four homework assignments in this course.
- In exams, you may bring and use your calculators (use of cellular phones instead of calculators will not be allowed).
- In homework assignments, you should work in teams of three or four people. It is your responsibility to find your team members.

Tentative Grading:

- % 30 Homework Assignments
- % 30 Midterm Exam
- % 40 Final Exam

Letter grades will be mainly based on the catalogue grading system described in Çankaya University regulations.