IE 334 Operations Research III – Stochastic Problems (3 2 4)

(ECTS: 7) 2025-2026 Fall – Tentative Syllabus

Instructors:
S. Shah Sultan M. QADRI
Office: L-322 Phone: 1371 e-mail: syedshahsultan@cankaya.edu.tr

Assistant:
TBA

Catalog Description:

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.

Text Book:

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

Supplementary Texts:

- Frederick S. Hillier and Gerald J. Lieberman, Introduction to Operations Research, 10th Edition, McGraw Hill, 2015.
- Taha, H.A., Operations Research, Prentice Hall, 8th ed., 2007.
- Sheldon M. Ross, Introduction to Probability Models, 10th Edition, Elsevier, 2010.

Tentative Course Schedule:

Week	Topic
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:

	Lecture	**Recitation**
Section 1	TBA	TBA
Section 2	TBA	TBA

Tentative Grading:

% 20 Homework Assignments (2 assignments, each is 10%)*

% 40 Midterm Exam

% 40 Final Exam

***Homework Policy – New Approach:**

This semester, instead of traditional homework, you will:

1. Complete 2 certificate courses (from Udemy or approved platforms) related to stochastic topics.
2. For each course, 1 exam question will be asked:
   - One in the midterm, one in the final.
3. The marks you get on these questions will be your homework grade (10 points each, total 20%)

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

Note that the instructor reserves the right to modify these percentages in case he finds it necessary.

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***.

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. Students 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 two homework assignments in this course.
- In *homework assignments,* students should work in teams of *maximum three students*.
  - It is the student's responsibility to find his/her team members.
  - Each team should submit a single written document including their work for each homework assignment.
- Further details about midterm exam, homework assignments, and final exam will be given later.

Honesty Policy: All students enrolled to this course are expected to act honestly and ethically and should declare her/his understanding and belief in the Honor Code stated below. Therefore, any form of dishonesty will not be tolerated. If you conduct any dishonest act during any course activity (i.e., cheating on exam, using any extra material that you are not allowed to use during an exam, copying materials off of someone else's homework or assignment, using solution keys from previous years, copying materials from published and electronic sources without paraphrasing and/or citing appropriately), you will get a credit of zero on that particular exam or assignment. Necessary disciplinary action(s), as dictated by the rules of Çankaya University, will also be taken.

Honor Code: Every student enrolled to this course should declare her/his understanding and belief in the Honor Code stated below by writing the Honor Code with her/his hand writing and signing it.

I hereby declare that in all the activities related to this course I'm enrolled: I will neither give nor receive any aid during the exam; I will not submit any assignment, project, report, or similar work which includes any part other than my or our group's work without citation and it will totally be my / our work.

[Burada kayıt olduğum bu ders ile ilgili tüm aktivitelerde: sınav sırasında hiç kimseden hiçbir şekilde yardım almayacağımı ve hiçbir kimseye hiçbir şekilde yardım etmeyeceğimi; sunacağım ödevlerin, projelerin, raporların, vb. işlerin, benim veya grubumun çalışması dışında referans vermeden hiçbir kısım içermeyeceğini ve tamamen kendi eserim / eserimiz olduğunu beyan ederim.]

NOTE THAT EVERYTHING ON THIS SYLLABUS IS SUBJECT TO CHANGE. STUDENTS WILL BE NOTED ABOUT ANY CHANGE.