IE 502 - Stochastic Processes
Course Syllabus
(2024-2025 Spring)

Instructor: Ertan Yakıcı

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Office Hour: TBD

Course Description:
Introduction to probability theory; random variables; expectations; conditional probability; discrete-time Markov chains; exponential distribution and Poisson process; continuous-time Markov chains; renewal theory.

Text Book:
Introduction to Probability Models, Sheldon M. Ross, 10th Edition, Elsevier, 2010.

Supplementary Books:
1. An Introduction to Stochastic Modeling, Mark A. Pinsky and Samuel Karlin, 4th Ed Elsevier, 2011.
2. Stochastic Processes, Sheldon M. Ross, 2nd Edition, Wiley, 1996

Tentative Course Schedule:

Week	Topic(s)
1	Introduction to Probability Theory, Random Variables, Probability Space
2	Discrete and Continuous distributions, Expectations and variances, probability generating functions
3	Conditional Probability and Conditional Expectation
4	Markov Chains: Transition analysis, Chapman-Kolmogorov Equations
5	Markov Chains: Classification of States, Limiting Probabilities,
6	Markov Chains: Mean Time Spent in Transient States, Absorption Probabilities and Absorbing Chains
7	Applications of Markov chains
8	The Exponential Distribution and The Poisson Process
9	Superposition and decomposition of Poisson Process
10	Nonhomogeneous Poisson Process, Compound Poisson Process
11	Continuous time Markov Chains: Birth and death processes, transition probability function
12	Continuous time Markov Chains: Limiting probabilities, queueing applications
13	Renewal Theory and Its Applications: Limit Theorems
14	Renewal Theory and Its Applications: Renewal Reward Processes, Regenerative Processes

Class meeting hours:
Tuesday 18:00-21:00

Tentative Grading:
% 30 Homeworks (5 Homeworks)
% 30 Midterm Exam
% 40 Final Exam

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 it is necessary.

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 via webonline. It is strongly recommended to attend all the lecture hours to understand the course material.

Conditions that may lead to the letter grade "NA":
Any of the following may lead to letter grade NA.
- If a student fails to take the midterm exam or the final exam will receive the letter grade NA.
- Less than 45% attendance to the lectures.
- If you can get a passing overall grade which is greater than or equal to the letter grade **CC**, this 45% minimum attendance requirement is dropped.

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 Lab Assignments:
- There will be a midterm exam, a final exam, and 5 homework assignments in this course.
- Further details about the exams and homework assignments will be given later.

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