



IE 502 - Stochastic Processes
Course Syllabus
(2016-2017 Spring)

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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 Expectations
4	Markov Chains: Transient 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

Grading:

- % 30 Midterm Exam
- % 30 Homework Assignments (5, each 6%)
- % 40 Final Exam