



**IE 502 Stochastic Processes**  
**Course Syllabus**  
**(2015-2016 Spring)**

**Instructor:** Haluk Aygünes

Office; Engineering Faculty, L-309

Phone; 1366, e-mail; [aygunes@cankaya.edu.tr](mailto:aygunes@cankaya.edu.tr)

**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, 10<sup>th</sup> 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, 2<sup>nd</sup> Edition, Wiley, 1996

**Course Outline:**

1. Introduction to Probability Theory, Random Variables, Sample Space, Expectations, Moment generating functions
2. Conditional Probability and Conditional Expectations
3. Markov Chains: Chapman-Kolmogorov Equations, Classification of States, Limiting Probabilities, Mean Time Spent in Transient State, Steady State Probabilities
4. The Exponential Distribution and The Poisson Process
5. Continuous time Markov Chains: Birth and death processes, transition probability function, Limiting probabilities, queueing applications
6. Renewal Theory and Its Applications

**Assessment:**

% 30 Midterm Exam

% 30 Homework Assignments

% 40 Final Exam