SIE 500b
Introduction to SIE Methods:
Stochastic Processes

Catalog Description: Introduction to probabilistic models commonly used in systems and industrial engineering and related disciplines. Markov chains, Poisson processes, queuing models.

Textbook: Sheldon Ross, *Introduction to Probability Models*, 9th ed, ISBN 0-12-598062-0, 2007.

Online Lectures: The online lectures posted on D2L correspond to the topics listed in the course outline below. The student is expected to review the course lectures and the corresponding readings from the text.

Grading: There will be three quizes administered through the D2L webpage and one take home final. Quizes count for 50% of the grade and the take home final counts for the other 50% of the grade.

Course Outline

1. **Introduction**

2. **Markov Chains**

    (a) *Definitions.* Read section 4.1.
    (b) *Models.*
    (c) *Analysis.* Read section 4.2, 4.3, and 4.4.
    (d) Take quiz number 1 on D2L site.

3. **Poisson Processes**

    (a) *Exponentially Distributed Random Variables.* Read sections 5.1, and 5.2.

    (b) *Definitions and Properties.* Read sections 5.3.

    (c) *Examples.*

    (d) Take quiz number 2 on D2L site.

4. **Queuing Theory**

    (a) *Notation and Assumptions.* Read sections 8.1, 8.2, 8.3, and 8.4. The introductory material in CH 6 may be helpful also.

    (b) *M/M/1 Queues.*

    (c) *Little's Result.*

    (d) *Other M/M models.*

    (e) Take quiz number 3 on D2L site.

5. **Final Exam** Contact course administrator for final exam.