Syllabus for Math 573 Applied Probability and Stochastic Processes
Books for Reference:

- N. C. van Kampen, Stochastic Processes in Physics and Chemistry.
- B. Oksendal, Stochastic Differential Equations, An Introduction with Applications

Topics:

1. General information about stochastic processes
    - A couple of examples: Gaussian Process, Poisson Process, Branching Process
    - Joint Distribution Functions
    - Kolmogorov's Extension Theorem
    - Correlations functions
2. Markov Processes
    - Kolmogorov's backward and forward equations
    - Chapman Kolmogorov's equations.
    - Master Equation
    - Semigroups and Generators
    - Markov Chains
3. Queuing and Renewal processes
4. Brownian Motion
    - Levy Construction
    - Properties of sample paths
5. Stochastic Integrals and Ito Formula
6. SDEs and Diffusions
    - Ito Formula
    - Kolmogorov's equations