SYLLABUS – MATH 601-COMPREHENSIVE EXAM
Stochastic Differential Equations and Applications

Topics:

1-Axioms of Probability, probability measure and probability spaces.

2- Conditional probabilities, Independent events, Discrete and continuous random variables.

3- Probability density function of a random variable. Expectation of a function of a random variable.

4- Moments generating functions. Conditional expectation. Limit Theorems.

5- Stochastic processes, Poisson Process, Markov Chains.

6- Brownian motion: Defining properties. Processes derived from Brownian motion.

7- Itô stochastic integrals. 1- dimensional Itô formula. The multi-dimensional Itô formula.

8-Stochastic differential equations(SDEs). Solving SDEs. Weak and Strong solutions.

References:
1-S.M. Ross. Introduction to Probability Models, 10th Edition. Academic Press, 2010 (**Ch. 1-5 and Ch.10**).

2- **B. Øksendal,** Stochastic Differential Equations: An Introduction with Applications. 6th Edition. Springer 2010. (**Ch.1-5**)